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SUSTAINABLE MOUNTAIN DEVELOPMENT AND THE KEY-ISSUE OF MARGINALISATION AND FARMLAND ABANDONMENT PROCESSES IN MOUNTAIN AREAS

FOCUS ON THE ALPS

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CONTENTS

LIST OF ABBREVIATIONS

CAP = Common Agricultural Policy

CEC = Commission of European Communities

EAGGF = EU Agricultural Guidance and Guarantee Fund

ERDF = European Regional Development Fund

ESF = European Social Fund

EU = European Union

LFAs = Less-Favoured Areas

LU = Livestock Unit

SFP = Single Farm Payment

UAA = Utilised Agricultural Area

SECTION I

THE BACKGROUND

CHAPTER 1 – INTRODUCTION

1.1 – Overview of the main topics

1.1.1 – The main threats faced by mountains at global level: over-exploitation *versus* under-use. Focus on marginalisation and land abandonment

"*Mountains are an important source of water, energy and biological diversity. Furthermore, they are a source of key resources as minerals, forest and agricultural products and of recreation*" (UNCED, 1992a). These are the words with which the international community, gathered in Rio de Janeiro in 1992, recognized and claimed the fundamental role played by mountain ecosystems at global scale. Mountains actually cover 24% of the world's land surface, providing a direct life-support base for about one-tenth of humankind as well as goods and services to more than half the world's population (see Paragraph 2.2.2).

In addition to their complexity and importance, also threats faced by mountain areas were underlined by the participants to the first Earth Summit, such as soil erosion, rapid loss of habitat and genetic diversity, marginalisation and environmental degradation as a whole. Hence, "*a proper management of mountain resources and socio-economic development of the people*" was strongly recommended, "*deserving immediate action*" (UNCED, 1992a).

Indeed, despite their functions and values, the sustainability of most mountain areas has been subject to many threats, which vary from country to country and place to place and can be summarised as follows (Cristóvão, 2002):

- exploitation of resources by exogenous agents which tend to reap off most benefits, such as wood, minerals and hydro-electric power;
- marked demographic trends, usually implying intense population decline and aging;
- rapid changes and general decline of agricultural activities, including animal husbandry;
- disappearance of traditional practices and professions;
- loss of cultural identity;
- lack of employment opportunities;
- growing socio-economic fragility;
- degradation of housing and infrastructures in general;
- increased risk of natural hazards;
- closure, lack or diminishing quality of basic community services, like schools, health units, post offices, transportation, businesses, and so on;

- tourism pressure on natural resources and environment in general;
- loss of political power.

However, above all "*the major threat to most mountain areas is the very own nature of the dominant development paradigm, which tends to marginalize the less favoured territories, and leads the State to invest in those areas which seem more capable to reproduce the capital (more competitive) and which have more power in terms of population pressure*" (*ib.*).

As a consequence, one of the main problems – maybe even the most crucial one – that mountain territories in industrialised countries are nowadays facing is the process of land abandonment, a phenomenon reflecting a post war trend of rural depopulation and marginalisation of wide rural regions, especially affecting mountain areas.

Although started already during the 19th century and interrupted during wars or other critical periods, the marginalisation trend has been raising dramatically since the end of World War II and is continuing to occur throughout the mountain areas of Europe (Piussi and Pettenella, 2000). In the last decades in particular mountain areas have been loosing most of the strategic importance they used to have in the past. Several products and raw materials formerly provided by mountains have been substituted by alternative goods (plastics, fossil fuels and so on), which in several cases was the primary cause for the marginalisation process to begin.

On this purpose, it is important to underline that marginalisation is a *process*, in the sense that it affects areas, which did not use to be marginal in the past. Marginalisation actually means "becoming marginal", rather than "being marginal": far from representing just a linguistic detail, such issue is of fundamental importance when analysing the phenomenon of land abandonment and its environmental and economic consequences (see Paragraphs 6.2.2). Neglect of previously cultivated or otherwise managed land thus implies, generally speaking, great impacts in terms of loss of stability and ecosystems' resilience, since a system whose equilibrium has been artificially altered needs continuous flows of inputs in order to be maintained as such. Since these inputs are no longer provided in case of abandonment, this might lead to a period characterised by instability and uncertainty of indeterminate length. In particular, having developed under human influence for hundreds of years, agricultural ecosystems remain vulnerable to inappropriate changes in the intensity of production, in the water regime or green cover, which could result in soil deterioration, erosion and landslides (EC, 1997).

Two different kinds of marginalisation can be distinguished, which are particularly significant from the point of view of land abandonment: *geographical* marginalisation and *sectorial* marginalisation (see Paragraph 3.2).

The main factors at the origins of geographical marginalisation are spatial isolation and physical remoteness, which gradually lead to geographical segregation of a certain area. In this case, a whole territory suffers from marginalisation, which affects all of the economic sectors taking place within that area, usually interested by negative demographic trends as well. Geographical marginalisation basically consists of processes of socio-economic and cultural decline, such as closing down of farm enterprises, unemployment, out-migration, over aging, brain drain, rural poverty and social exclusion, lack of infrastructures and services and environmental degradation.

On the other hand, sectorial marginalisation means that a certain economic sector is no longer viable, while other lines of business become significantly more profitable. In particular, agricultural marginalisation is a process of sectorial marginalisation where agriculture is the economic sector which is affected the most. More precisely, agricultural marginalisation is considered to be "*a process, driven by a combination of social, economic, political and environmental factors, by which certain areas of farmland cease to be viable under an existing land use and socio-economic structure*" (Baldock *et al*., 1996). Several socio-economic and environmental factors contribute to cause agricultural marginalisation: a combination of unfavourable climatic and environmental conditions, uncompetitive forms of agriculture involving low productivity and income levels, remoteness from markets, poor transport conditions, shortage of adequate infrastructures, demographic changes such as depopulation and ageing, as well as small farm size is often at the origin of the marginalisation process (*ib.*).

Both kinds of marginalisation are widespread in the mountain areas of Europe and, although different, potentially lead to the same outcome, i.e. land abandonment. Wherever geographical marginalisation occurs, the running down of any economic activity gradually leads to the total abandonment of both land and settlements. Different is the case of agricultural marginalisation: this process partly overlaps geographical marginalisation, i.e. when it occurs in areas which are also affected by the latter process, where agriculture faces the same problems as other economic sectors. Yet, agricultural marginalisation often takes place in areas which are well developed from a socio-economic point of view, e.g. tourist resorts or industrial areas, where agriculture is at the margin of economic viability. Since their prosperity is based on other economic sectors than agriculture, decline of farming activities and farmland abandonment usually occur, unless policy tools specifically aimed at counteracting these trends are put in place.

Indeed, nowadays the mountains of Europe do not include only economically weak regions, but also some very wealthy communities with highly industrialised and/or tourism-based economies (Nordregio, 2004), which constitute approximately 60% of the total area in the Alps (Stone, 1992). Such a dichotomy is just the other side of the process above explained, since marginalisation of most peripheral areas comes together with a process of "polarisation", which means that small villages on mountain slopes are largely abandoned, while people tend to concentrate in urban-like settlements along the valley floors, where social, health and educational services, infrastructures and economic activities are mostly concentrated.

Such a polarisation trend usually follows urban development models, which have been shaping European lowlands, while being rarely compatible with mountain environments. Nevertheless, the implementation of "lowland-cities" development schemes in some mountain areas has been strengthened by the dramatic growth of mass tourism and especially winter tourism, requiring distinctive infrastructures and settlements. Hence, the polarisation process in most of the cases led to shapeless, chaotic hyper-urbanisation phenomena, while at the same time causing a loss of cultural and architectonic heritage, often conveying to a decline of the common values at the basis of the social structure and, eventually, to the complete breakdown of the civil society as a whole.

For their major evidence, the main focus is usually on the problems of these overdeveloped Alpine regions, while the problems of remote, economically weak regions are hardly recognized (Stone, 1992). Furthermore, even when focusing on favourably located areas, the problems considered are usually related to overuse, in terms of land consumption, air and water pollution and overexploitation of natural resources. On the contrary, as explained above, underuse does not occur only in economically weak, marginal areas, but also in tourist and industrial centres, since here only selected areas are devoted to very intensive forms of use, while the remaining areas are virtually unused and deteriorate (*ib.*).

1.1.2 –Marginalisation is not a marginal issue

As above mentioned, marginalisation and land abandonment have numerous socio-economic and environmental causes (see Chapter 3). Yet, one of the most frequent factors leading to marginalisation processes is the low level of interest commonly aroused by mountain problems and the consequent scarce political attention towards these territories. One of the reasons for such a neglect might be the shortage of stakeholders being interested in raising such issues, which is closely connected with the low level of awareness about the consequences caused by marginalisation and abandonment. Moreover, more and more mountain inhabitants leave their birth territories, while environmentalist organisations rarely focus on these topics.

On the contrary, mountain issues do matter (see Paragraph 2.2.2). Even in ancient times it was well-known that what happens upstream sooner or later affects what is downstream. The Venetian Republic promulgated a regulation in 1476 stating that "*el dito desboscar è causa manifestissima del far atterrar questa nostra laguna, non avendo le pioge et altre inundation alcun retegno né obstaculo, come haveano de essi boschi, a confluire in esse lagune*...", which might be roughly translated into the following sentence: "deforestation (in the mountains) is an evident cause of the process of filling our lagoon with earth, since there are no longer obstacles to rain or floods to flow into the lagoon, contrary to what they used to have thanks to the woods".

More recently, Chapter 13 of Agenda 21 affirmed that mountains still provide a number of essential resources and services, namely watershed resources, soil protection, biodiversity maintenance, wood growth, open space for recreational activities, carbon sequestration, natural hazards prevention and sediments' balance along the coasts (UNCED, 1992a).

Since neglect and land abandonment create environmental, economic and social impacts affecting the whole society, not just mountain communities, mountain problems need to be raised and faced more effectively, while the disregard so far largely shown by policy-makers and land planners towards mountain territories strongly affected their development, which in some cases took the forms of underdevelopment, no-development or even regression.

1.1.3 – Forest expansion as the most evident land abandonment indicator

As a consequence of land abandonment, mountain regions have been experiencing a radical landscape change, as once cultivated areas turn to forests through the process of natural succession. The extent of this phenomenon is already so evident, that a debate began even outside the academic environment, mountain communities and environmentalist organisations. *Newsweek International* recently published an article titled "*Into the woods*", depicting Europe as a land under renaturalisation where large parts are going back to their primeval state, with wolves and bears taking the place of people (Theil, 2005). All across the southern Alps in particular villages have emptied out and forests have grown back in. The author wondered whether this represents an eco-environmentalist's dream in terms of return of primitive wilderness into a densely settled landscape deeply modified by human activities, or – on the contrary – the problem is more complex than it might seem, since "*the scrub bush and forest that grows on abandoned land might be good for deer and wolves, but is vastly less species-rich than traditional farming, with its pastures, ponds and hedges […], whereas a new forest does not get diverse until it is a couple of hundred years old*" (*ib.*).

Yet, according to a widespread, well-rooted belief, the strong increase in woodland surface occurring in mountain areas of most of the industrialised countries represents a positive process, contributing to counteract deforestation trends in other parts of the globe and the loss of large tropical forest extensions, mainly taking place in developing countries (see Paragraph 8.1).

On the contrary, the uncontrolled development of new forest areas might represent a problem by itself, causing a number of social, environmental and economic impacts, including loss of cultural landscapes and habitat variety, bio and eco-diversity depletion, landscape homogenisation and closure, waste of economic and natural resources, loss of productive land, depletion of environmental services and increased risk of natural hazards such as floods, landslides and fires (see Chapter 6).

Moreover, as already mentioned, wood extension often is just the most evident effect of an otherwise less apparent and somehow silent marginalisation, depopulation and ageing trends affecting many mountain and high-hilly regions in industrialised countries throughout the world, finally leading to the collapse of traditional, land-rooted civil societies.

The significance of the phenomenon can be caught through the results of a research project coordinated by Euromontana on behalf of the European Commission in 1998, which provided a comparative analysis of 25 European mountain case studies in order to assess the environmental impacts of land abandonment and decline in traditional labour intensive farming practices. The research found out that abandonment is widespread (21 out of 25 areas suffered from some form of abandonment) and that abandonment generally has an undesirable effect on the environmental parameters examined, thus representing one of the main pressures on the environment (Dax and Wiesinger, 1997 and 1998; Euromontana, 1997 and 1998; MacDonald *et al*., 2000).

Although land abandonment and afforestation processes do occur in most of European countries, the magnitude they reach is apparently maximum, both in absolute and relative terms, in Italy, where forest areas have been dramatically increased during the past 60 years and the increment was of 7% during the last decade of the 20th century (Piussi and Pettenella, 2000).

One of the reasons for that is the large extension of mountain regions, which cover more than half of the national territory, together with the great variety of mountain landscapes and contexts. Surprisingly, the most important change in land use which has taken place in Italy during the second half of the 20th century, from a quantitative point of view, is not the urbanisation process, but the increase of forest area in place of former agricultural land (*ib.*). Italy thus represents a meaningful case study, both for its passed history and for the land use changes currently taking place at national scale (see Paragraphs 5.3.2 and 5.3.3).

1.2 – The geographical extent: introduction to the Alps

The phenomenon of farmland abandonment and the consequent forest expansion somehow affect mountain areas in all industrialised countries and in Europe in particular. The phenomenon is widespread, for instance, throughout the Eastern European countries and especially the new Member States, where during the nineties millions of hectares of farmland were abandoned as a result of the transition process (Keenleyside *et al.*, 2004). Yet, every country and every massif has its own history: for example, adverse economic changes reduced the viability of established forms of agricultural production both in Western and Eastern Europe, but these have been less severe in the EU than in Central and Eastern Europe, where they were driven in particular by the abrupt transition towards a market economy (EEA, 1999a) and led to a very sharp and rapid decline in farming activities, particularly in the livestock sector, in most countries in the early nineties (Keenleyside *et al.*, 2004).

This research mainly focuses on the Alps, the highest and most extensive mountain system in Europe. The Alps have not been chosen only for their extension and strategic location, which contributed to make them so important in the history of the so-called *Mitteleuropa*. The Alps have been also selected for other important reasons, such as the prominent cultural character of their landscapes, the fundamental role that nature-human as well as uplands-lowlands interactions have always played within them, the significance of socio-economic components and the widespread concern about the conservation of such a great natural and cultural heritage.

Nowadays, although presenting a wide range of peculiarities in terms of both threats and opportunities, the Alps can somehow be regarded as a paradigm of the challenges facing sustainable development in European countries, with particular regard to hilly and mountain areas. A number of initiatives, such as the Convention for the Protection of the Alps (see Paragraph 2.3.4), the only binding instrument in existence that specifically deals with a mountain range, are then to be seen as attempts at implementing sustainable development principles in a number of sectors, from mountain farming to transport, thus placing the Alps among the most interesting environments acting as sustainable development "laboratories".

Although split among 5,558 municipalities, 69 local governments (Tappeiner *et al.*, 2003a) and seven countries (see Figure 1.1), of which one (Slovenia) has only recently joined European Union while another one (Switzerland) does not belong to the Union at all, the Alps somehow represent an *unicum* from several points of view. Even though the Alps are characterised by a great variety of landscapes, languages, traditions and cultures, they also share significant roots in common.

The Alps comprise a total area of 240,000 km^2, with a length of about 1,000 km and a width ranging from 130 to 250 km. Most groups in the Alps exceed 3,000 m a.s.l., with many summits even rising above 4,000 m, the highest being Mont Blanc, reaching 4,907 m a.s.l. (see Figure 1.2). The Alps are composed of greatly extended parallel mountain chains, running straight from east to west and curving towards the western end (see Figure 1.3). The Alps thus include very large intermontane valleys and basins, high snow- and ice-capped peaks, hilly piedmont regions and deep valley floors (Stone, 1992).

Because of their size and location, the Alps exhibit a great range of climate conditions, with a continuous gradual transition from one to the other. Indeed, climate conditions change according to several gradients. First of all, climate changes depending on the altitude: as elevation increases, the average temperature drops, the annual growing season becomes shorter and precipitations increase. Local climate also depends on the location within the massif itself: whereas the interior zones of the Alps are characterised by heavy rainfall, oceanic influences prevail in the climate of exterior Alpine zones. Yet, whereas southern Alps are subject to Mediterranean climatic influences, the northern Alps have a central European continental climate. The same gradient can be observed from west to east, since climate ranges from the moist oceanic climate in the west to the dry continental climate in the east. Finally, climate also varies depending on the latitude, i.e. from north to south (Stone, 1992).

Such a great climatic variety gave origin to an equally huge complexity in terms of vegetable patterns, which is also a product of the interplay among geologic, geomorphological and climatic conditions. Alpine ecosystems, which tohether constitute one of the 238 priority ecoregions identified by the WWF, host about 30,000 animal and 13,000 plant species, 4,500 of which are vascular plant species, corresponding to 39% of Europe's flora (WWF, 2004).

Because of their strategic location as "backbone" of Central Europe, the Alps have been among the earliest-settled regions of Europe and they have always played a central role within European history, while marginality is a more recent phenomenon. The growing marginality of Alpine territories went hand in hand with the development of public image associated to the Alps throughout European history, as described by Stone. In ancient times the Alps were considered as frightening "*montes horribiles*", hostile to man; this scary view influenced their image until well into the 18th century (Stone, 1992). On the contrary, during the age of European industrialisation the public image of the Alps changed completely, mainly thanks to several romantic poets, writers and painters, who referred to the Alps as an idyllic world.

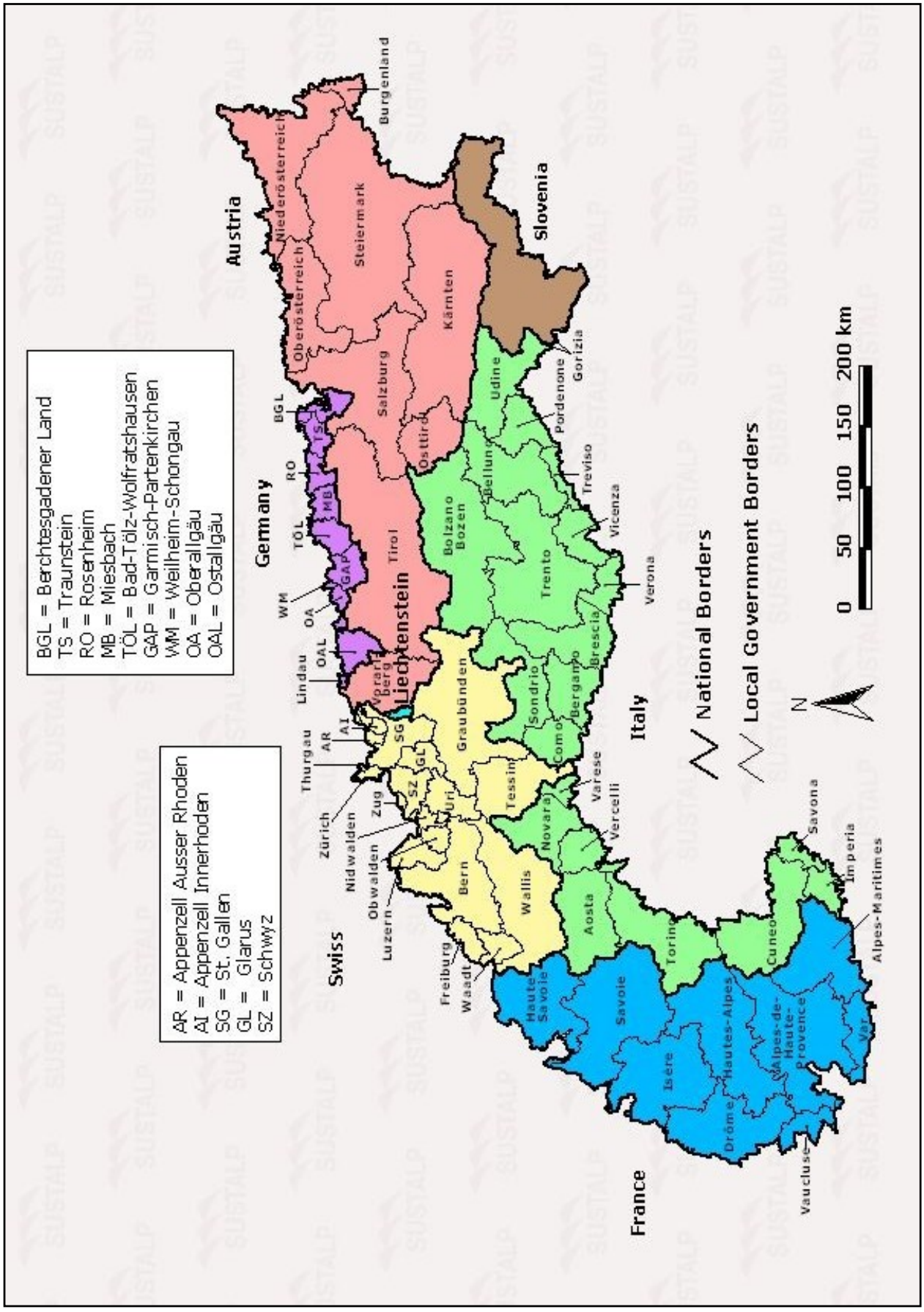

Figure 1.1 –The Alps: administrative borders. Source: Tappeiner *et al.*, 2003b

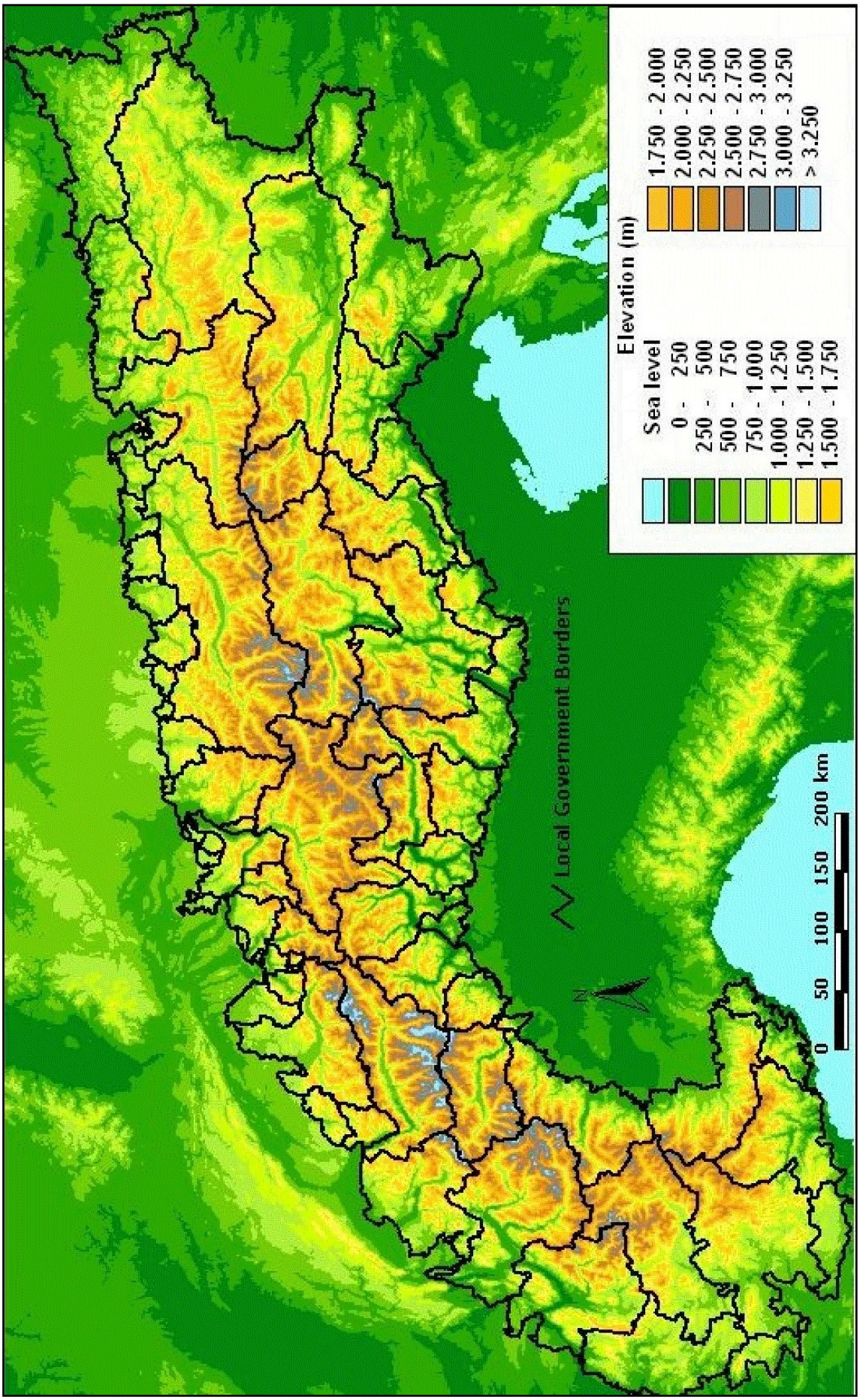

Figure 1.2 – Elevation map of the Alps. Source: Tappeiner *et al.*, 2003b

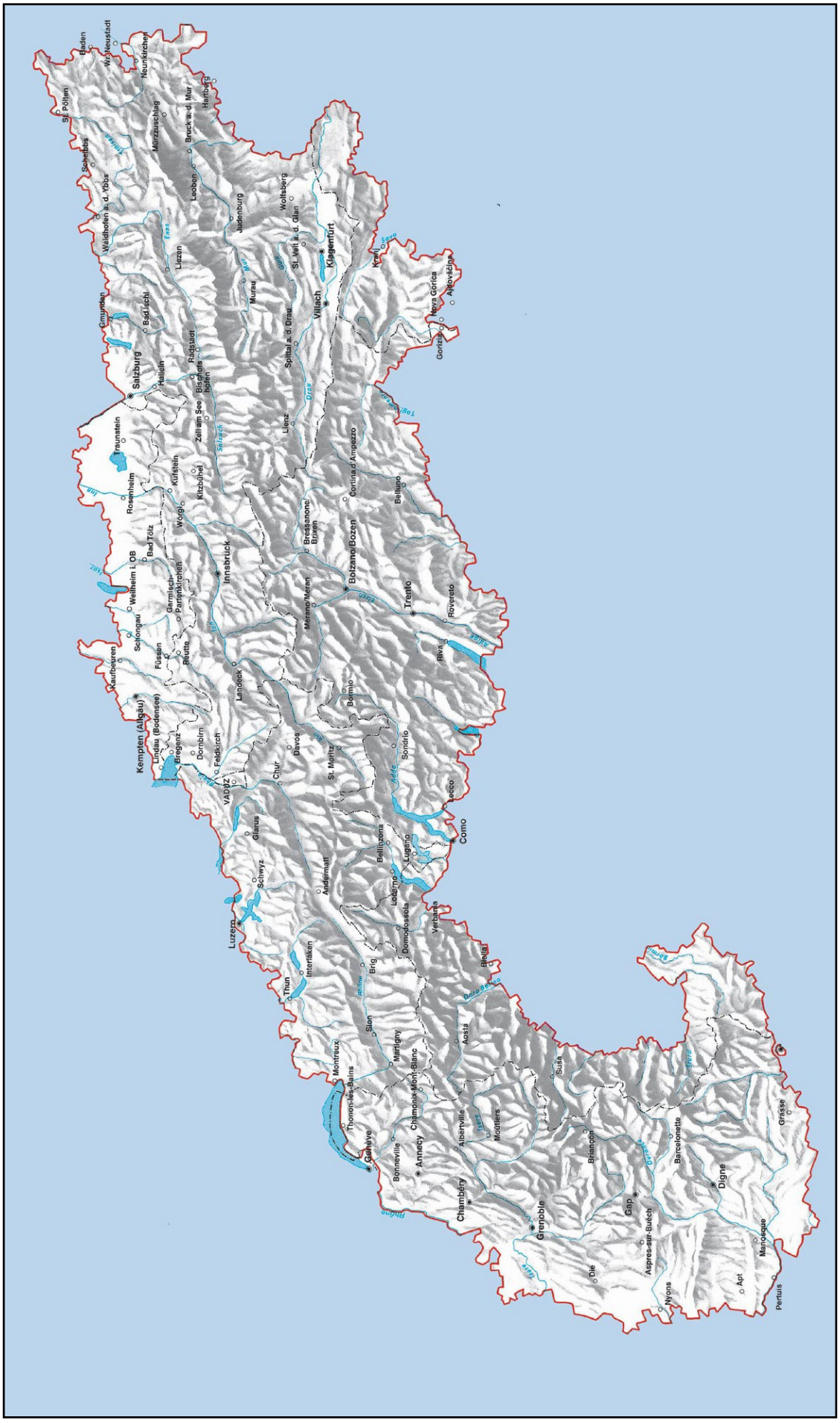

Figure 1.3 – Map of the Alps (area covered by the Alpine Convention). Source: www.cipra.org, 2003

During the so-called *Belle Epoque* (1889-1914) the Alps became very popular and tourism flourished. According to this icon the Alps are seen as an environment still characterised by a complete harmony between man and nature (*ib.*), in contrast with urban areas, more and more dominated by artificial structures. Of course, such an idealistic image did not correspond to the reality, as most of the land was then intensively cultivated and exploited, although land management was really characterised by an intrinsic sustainability, which was a necessary prerequisite in a context where the effects of any human action on the environment unavoidably reveal themselves rapidly and in an often dramatic evidence.

More recently, the image of the Alps has been characterised by two different, yet co-existing, views. On the one hand the Alps are nowadays mass tourism destinations, visited not only for their natural and cultural heritage, but increasingly appreciated also for the possibility of practising summer and winter sport activities. On the other hand, apart from their role as tourist asset, which only concerns certain areas, the largest part of the Alpine regions is looked at as a marginal territory of natural disasters and major environmental destruction, affected by recurring floods, landslides and avalanches (*ib.*).

As regards tourism development, which represents the phenomenon more often associated to the Alps both for its socio-economic and environmental implications, some data can be useful to properly frame the phenomenon and recognize its real extent (see also Paragraph 3.2.1). The image of the Alpine arch as a unique tourist area often leads to an overestimation of the economic role of tourism. Figure 1.4 shows the distribution and density of tourist infrastructures expressed in terms of number of beds per inhabitants.

Highly intensive tourism can be found in the Alpine skiing centres in the French Alps (Upper-Savoy, Savoy, Upper-Alps, Upper-Province-Alps), in Austria (Tyrol, Vorarlberg, Salzburg, Styria) and in the Dolomites in Italy (South Tyrol above all, and partly also the provinces of Belluno and Trento).

The differences among the Alpine countries are quite well marked: whereas in French Alpine regions there are even 51.5 beds/100 inhabitants, for instance, in Austria there are 36.7 beds/100 inhabitants, and the average datum for the Italian Alpine arch is only 13.5 beds/100 inhabitants (Tappeiner *et al.*, 2003b). Moreover, tourist infrastructures in Italy are unevenly distributed, as shown by Table 1.1, reporting tourist intensity per province.

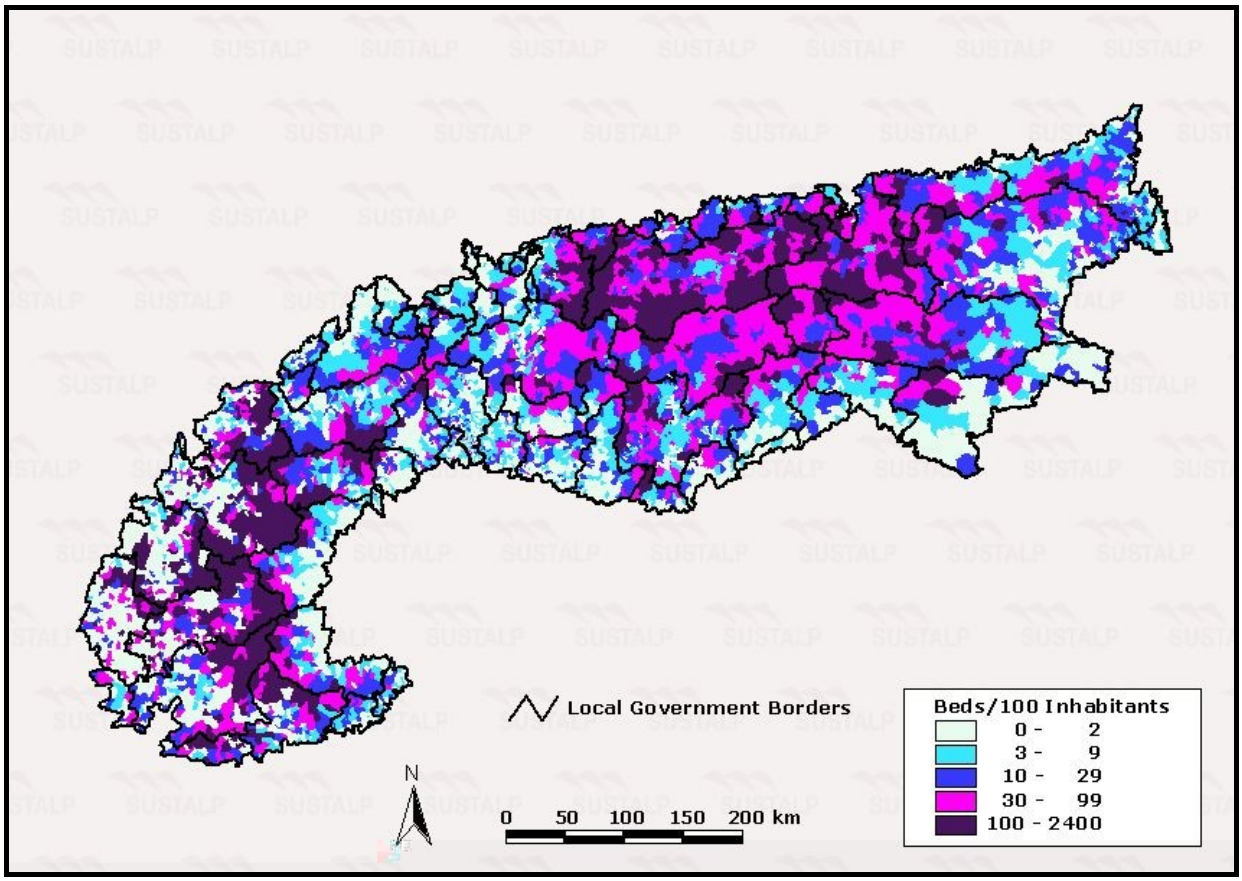

Figure 1.4 – Tourism intensity in the Alps. Source: Tappeiner *et al.*, 2003b

From these data it clearly appears that tourism in the Alps is seldom characterised as spread evenly over a whole area, while it is rather a spot or band formed phenomenon (*ib.*). A large proportion of the guest beds are concentrated in only a few regions. Generally, only 10% of all Alpine municipalities own vast tourist infrastructures and depend solely on tourism (Bätzing, 1997). Yet these places, although important to regional tourism, are characterised by a strong dependency of the income structure on the tourist sector (Tappeiner *et al.*, 2003b).

It is unquestionable that tourism often offered the only possibility for economic development of some mountain areas which otherwise would have most probably suffered from serious marginalisation processes. Nevertheless, it is important to keep in mind that tourism is unevenly distributed throughout the Alpine arch, and benefits deriving from tourism are mostly concentrated in very limited areas. Moreover, tourist development took place in territories responding to particular requisites especially in terms of landscape amenities. Most of these areas are located at higher altitudes, while high-hilly areas as well as mountain areas of medium altitudes could hardly exploit this opportunity of economic development. These areas, characterised by less tourist attraction and demand, remain threatened by economic decline and population exodus, and also farming suffers from marginalisation tendencies, so that farmland is gradually converted into forest (Dax and Hovorka, 2004).

LOCAL GOVERNMENT	BEDS	BEDS/100 INHABITANTS
ITALY as a whole	514,907	13.5
Aosta	29,702	25.6
Belluno	30,774	14.5
Bergamo	9,758	3.2
Provincia Autonoma di Bolzano/ Autonome Provinz Bozen	160,466	36.5
Brescia	23,206	7.6
Como	13,275	5
Cuneo	12,694	7.7
Gorizia	36	2.7
Imperia	1,367	5
Novara	16,693	9.1
Pordenone	2,178	4
Savona	1,788	6.7
Sondrio	24,900	14.2
Torino	17,343	5.9
Trento	120,940	26.8
Treviso	1,483	1.6
Udine	8,611	6.8
Varese	4,600	3.4
Vercelli	2,845	2.5
Verona	21,220	24.2
Vicenza	11,028	4.6

Table 1.1 – Tourism intensity in Italy (number of beds/100 inhabitants). Source: Tappeiner *et al.*, 2003b

INDICATOR	VALUE
Population density (inhabitants/km^2)	62
Employment rate (%)	43.9
Employed in agriculture (%)	5.6
Rate of older people (>65 years)	14.9
Rate of children (<15 years)	17.2
Migration balance (from 1987 to 1997) (%)	3.7
Tourism intensity (beds/inhabitants)	0.25
Farms with part-time farming (%)	64.3
Increase/decrease in part-time farming from 1987 to 1997 (%)	-9.4
Farm abandonment factor (changes from 1987 to 1997) (%)	-14.9
Farmers > 45 years (%)	68.3
Small farms (< 5 ha UAA) (%)	65.4
Decrease in UAA (from 1979 to 1997) (%)	-4.8
Permanent grassland area/UAA (%)	67.7
Permanent crop area/UAA (%)	6.2
Decrease in livestock (L.U.) (from 1979 to 1997) (%)	-8.9

Table 1.2 – Socio-economic and agricultural indicators for the Alpine arch. Source: Tappeiner *et al.*, 2003a.

As regards other important aspects, such as population, social structure and economy, the value of some basic indicators are reported in Table 1.2. Data refer to beginning of the nineties, ranging from 1988 to 1996. Further data regarding demographic trends, state of mountain farming and forest extension will be described more into details in Chapter 5.

1.3 – Goals, assumptions and methodology

As a whole, international community has for a long time largely underestimated the overall impact of land abandonment in mountain areas, thus just lately recognized in policy development. In recent times such issue has gained considerable importance in several scientific disciplines like forestry, geology, biology, hydrogeology, social science and even architecture. Yet, while sectorial studies have been successfully undertaken concerning specific aspects of mountain depopulation, agricultural decline, land abandonment and forest expansion, a broad and interdisciplinary overview of the phenomenon had never been undertaken so far.

As a consequence, most of the local and global initiatives in favour of mountain areas were generated and developed within a sectorial context and mostly focusing on strictly mountain-related issues. On the contrary, problems presently affecting mountain regions mainly take origins from exogenous factors. In particular, marginalisation and land abandonment processes do have external causes, deeply rooted in the current global socio-economic trends (see Chapter 3). On the other hand, also impacts caused by land abandonment in the mountains heavily affect the whole society, i.e. also downstream populations, not just mountain communities (see Paragraph 2.2.2 and Chapter 6)

For all these reasons viable solutions need to be explored in a wider context, trying to integrate mountain policies into sustainable development policies as a whole, by taking mountain issues into account while facing each of the related aspects, thus turning sustainable mountain development into a transversal matter. In particular, policies need to be worked out and implemented at basin level, thus taking into account how land use changes in the mountains influence downstream populations, especially in terms of sediments' balance along the coasts and availability of water resources and hydroelectric power.

Following these premises, one of the main goals of the research has been to provide an interdisciplinary, wide-spectrum overview of the issues of marginalisation and land abandonment affecting large mountain areas in the industrialised countries throughout the world. To this regard Naveh stressed the importance of "*bridging the communication gap between the academicians*

and the professionals, the conservation-minded ecologists and the production-minded foresters, agronomists, economists and engineers" (Naveh, 1994b). Although aware that not all ecologists are conservation-minded, nor all the foresters, agronomists and economists are production-oriented, it is widely recognized that a communication gap among these disciplines does exist and that this gap needs to be filled somehow.

The research moves towards this direction, trying to present and integrate the main results provided by numerous sectorial studies from several different disciplines with regard to farmland abandonment and the consequent spontaneous afforestation. The approach adopted thus embraces all of the three components of sustainable development: environmental, social and economic aspects have been analysed in parallel, which represents quite an exception in the survey of the literature on this topic.

More particularly, the phenomenon of farmland abandonment and the consequent forest expansion will be analysed by using the DPSIR framework (see Paragraph 1.4 and 1.4.1 in particular), which had never been applied before to this topic. The research has thus not only described the extent of the phenomenon, but it also investigated its reasons, the impacts and consequences caused in environmental, social and economic terms, as well as the actual and potential solutions which might be implemented in order to counteract current trends.

The second main goal is actually to present intervention tools and strategies aimed at counteracting the process by describing and assessing a number of good practices, in terms of policy and planning measures implemented in those areas, which have been most successful in addressing marginalisation trends and the relative consequences by preventing or lessen them.

Yet, one might reasonably argue that traditional mountain farming practices and the natural and cultural heritage associated with them are not necessarily to be considered as valuable, since their evaluation is highly subjective. As a consequence, it is not automatically worth maintaining them as such. On the contrary, the opportunity whether to invest expertise, time and money in such a goal needs to be carefully weighted.

In the course of the thesis several arguments will be put forward in favour of the maintenance of cultural landscapes mainly by means of continuation of extensive mountain farming practices. For example, the impacts caused by land abandonment in terms of increased risk of natural hazards, loss of open spaces and biodiversity depletion, will be widely explained in Chapter 6, together with the fundamental role played by agricultural activities in shaping the landscape – considered also as an essential tourist resource – and keeping an ecological and hydrogeological artificial balance superimposed on agro-ecosystems several hundreds of years ago, thus requiring a continuous flow of inputs in order to avoid the complete breakdown of such equilibrium.

On the other hand, Chapter 2 will go through the main international documents affirming the importance of conserving cultural landscapes and, to a large extent, also the opportunity that this task will be carried out by the same forces which have always been responsible for their maintenance, i.e. farming practices. As one might infer from Chapters 2 and 7, the European Union in particular is strongly committed in this sense, recognising the maintenance of low-intensity systems as a priority for both social and environmental purposes[1].

Nevertheless, there is another, crucial factor to be considered, which is somehow connected with the interest shown by the EU on this topic. The disappearance of traditional features of cultural landscapes would actually mean the loss of one of the main aspects of European variety. In marked contrast to the situation in other parts of the world, and especially the USA, a large proportion of the land area of Europe has been farmed for several millennia. Europe is thus characterised by many different economic and social systems which have existed in close proximity within very small areas (Stone, 1992). Such a complexity is highly valued among Europeans, both within scientists and among common people, who for the largest part consider the preservation of this natural and cultural heterogeneity a fundamental ingredient of European identity.

Even outside Europe, its image is of "*a continent where every scrap of land has long been farmed, fenced off and settled, where every tree has been measured, counted and named*" (Theil, 2005). While in the American West people moving on and the wilderness growing back was somehow part of the natural cycle, in Europe people have always been used to be surrounded by fields, orchards and pastures (*ib.*).

It is not a pure coincidence that the concept of wilderness and its associated value were firstly developed by United States key personalities such as John Muir, the founder of Sierra Club and one of the main promoters of the establishment of the Yosemite National Park. Yet, as explained in Chapter 8, the current definitions of wilderness[2] do not fit European landscape really well, while this is more properly described by the landscape definition provided by the European

[1]For instance Reg. 1257/99, Art.22, states that agri-environment support "*shall promote an environmentally-favourable extensification of farming and management of low-intensity pasture systems*", together with "*the conservation of high nature-value farmed environments which are under threat and the upkeep of the landscape and historical features on agricultural land*" (CEC, 1999).

[2] According to the IUCN (International Union for Conservation of Nature and Natural Resources), a "wilderness area" is "a *large area of unmodified or slightly modified land, and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition*". Likewise, according to the US Wilderness Act, "*a wilderness, in contrast with those areas where man and his own works dominate the landscape, is recognized as an area where the earth and its community of life are untrammelled by man; it generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable"* (US Congress, 1964).

Landscape Convention[1], stressing its cultural character and the essential role played by human activities, and especially agriculture, in contributing to shape the landscape as it looks today.

Most European landscapes, even some of those which appear to be natural, have been shaped and influenced by sophisticated forms of human activity, mainly historical methods of farming depending on a careful and sustainable interaction with the natural environment. Alpine pastures, dry meadows, marshes, hedges and terraces can all be mentioned in this context. Even forests have been subject, historically, to human influence, as in former times they were closely integrated into agricultural production systems (EC, 1997).

Such a diverse background is also reflected by the different attitude towards the impact of agriculture on the environment. This is basically modelled as an external cost associated with input use by North American and Australian commentators. The most significant example of this approach, called the "input model of environmental impact", is given by water pollution caused by fertilisers and chemicals utilised by farmers, imposing external costs on water users and damaging ecosystems. A key implication of this approach is that "*a reduction in the level of price support inevitably leads to a reduced intensity of production and thus to an improvement in environmental quality*" (Hodge, 1998).

On the other hand, the so-called "output model of environmental impact" as regards agriculture emphasises marketed food and environmental quality as somehow separate products of the land. This approach, which is mainly supported by European commentators, focuses more on the positive externalities provided by agriculture, especially in terms of landscape and biodiversity conservation. The output model usually assumes that "*over certain levels and styles of production, particularly in respect of relatively extensive grazing systems, agricultural outputs and environment are complementary, which means that a reduction in agricultural prices and hence of production may lead to a reduction of environmental quality. For example, as the price paid for livestock products falls, livestock grazing may become sufficiently extensive for undesirable scrub species to invade pastures that would otherwise maintain wildflowers*" (*ib.*). One of the main consequences of such an approach is actually the shift from market measures towards rural development measures, which has marked the most recent CAP reforms (see Chapter 7).

To summarise, "*while the input model assumes an agriculture operated in opposition to the "natural" environment, the output model is premised on agricultural systems that have often co-*

[1] The European Landscape Convention defines the landscape as "*an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*", so that landscape protection implies "*actions to conserve and maintain the significant or characteristic features of a landscape, justified by its heritage value derived from its natural configuration and/or from human activity*" (Council of Europe, 2000).

evolved with the environment over substantial periods of time, to the extent that there is a close interrelationship between the valued characteristics of the environment and certain attributes of the agricultural systems". The implications are enormous: while "*the former model implies that policies to improve the environment should* restrict *agricultural activity, the latter often implies that policy should* support *agricultural systems, especially in less favoured areas, where the major environmental threat arises from decline or abandonment of agricultural uses*" (*ib.*), e.g. many mountain regions.

The reasons for the geographical distribution of these two different and to some extent even opposite approaches are mainly historical. Indeed, in Europe human intervention, particularly by means of agricultural activities, has completely transformed the environment throughout the millennia to the extent that nowadays there are no natural landscapes left, but only anthropogenically shaped cultural landscapes, which represent the foundation of all human life and economic activity.

Conversely, on the other side of the Atlantic Ocean, extremely extensive and nomadic agricultural and especially animal husbandry activities were practised until very recently, i.e. just a couple of centuries ago, while most of the territory basically remained natural. Later on, when people from the eastern coast started to colonise western territories, a modern and semi-intensive agriculture also began. This kind of farming practices suddenly started to heavily transform a landscape which was previously basically untouched, causing serious environmental damages.

However, the issue would certainly deserve to be analysed also from a quantitative point of view. Attempts to assess the economic value of the new landscapes and forests resulting from the process of land abandonment would be essential in order to carry out a cost-benefit analysis, comparing the option of letting the situation evolve without any control *versus* the possibility of counteracting this process, thus assessing the opportunity of investing for the maintenance of the *status quo* or even the restoration of cultural landscapes where already partly compromised.

In particular, the role of new forests as "sinks" within the application of the Kyoto Protocol[1] assumes great significance, even though it has to be bear in mind that forests resulting from unintentional spontaneous renovation are not counted as carbon credits, which only comprise planned afforestation or reforestation (see Paragraphs 6.4 and 8.1).

[1] Sinks are any natural or man-made systems that absorb and store greenhouse gases (GHGs), primarily CO_2 from the atmosphere. To be considered a sink, a system must be absorbing more CO_2 than it is releasing so that the store of CO_2 must be expanding.

Although this analysis was not intended to be included among the aims of the research, mainly because of the considerable amount of work that this task would have further required in addition to that already foreseen, it is unquestionable that such a study would provide a valid complement and/or support to this research. Currently, lacking this information, the research is based on the assumption that the complexity and variety of European mountain cultural landscapes are worth maintaining for present and future generations. Although such an hypothesis cannot be supported by a cost-benefit analysis in economic terms at present, several reasons in favour of this assumption will be presented throughout the work.

The overall approach of the research has thus been qualitative, rather than quantitative. Statistical data and indicators have been obviously considered and utilised throughout the research, especially while describing the state of the art as regards land abandonment related issues. Yet, the analysis of the phenomenon has not been limited to its description, whereas causes and consequences have been considered essentially from a qualitative point of view, although quantitative data have been used in support of the analyses wherever appropriate and/or possible.

Such a methodological choice is only partly due to the scarce availability of data, while the main reason is given by the character of the issues considered, which necessarily require deep analyses going beyond the pure calculation of a number of indicators. Since the value of certain indicators is however essential in order to make any consideration about any issue, it has been chosen to utilise already available data and indicators and to undertake a mainly qualitative analysis based on these data and aimed at interpreting them within a wider and interdisciplinary context.

To give an example, data reporting a positive demographic trend might be interpreted in two totally different ways, depending on the social, geographical and environmental background. Population growth may actually be seen positively when occurring in a marginal mountain area traditionally dominated by depopulation and land abandonment, where land care provided by local communities is lacking. On the contrary, the datum might be even worrying when referring to densely populated valley floors where environmental and social pressures are already evident. Moreover, these data need to be combined with information regarding the socio-economic context as a whole, the regional and global trends responsible for determining this situation and the potential impacts derived.

To this end, large part of the research has focused on the currently available literature directly or indirectly dealing with marginalisation and land abandonment related issues, with regard to

mountain areas in particular. Interviews to experts and researchers have also played a pivotal role within the research and particularly during the study periods abroad at the *Bundesanstalt für Bergbauernfragen* (Austrian Federal Institute for Less-favoured and Mountainous Areas), in Vienna, and the *Macaulay Land Use Research Institute* in Aberdeen, Scotland. Several field surveys in different countries have finally contributed to the elaboration of the analyses and considerations here reported.

Austrian experience in particular played a fundamental role in the identification of the key-principles to be adopted into mountain policy measures (see Chapter 11). Austria has been chosen as case-study for its long-established tradition of integration of subsidy-based support systems and regional planning programmes specifically targeting mountain farming (see Chapter 9).

Although largely based on the existing literature, the originality of the work is mainly to be found in:

- *The theme itself* - While several studies deal with mountain related problems and particularly the threats caused by over-exploitation of mountain resources, such as mass-tourism, transboundary transport, hydro-electric power exploitation and so on, very little research has been undertaken having marginalisation and land abandonment as the main focuses;
- *The vision* - As a whole, international community has for a long time largely underestimated the overall impact of farmland abandonment in mountain areas. Whereas most of the European academic environments are now recognising the relevance of this phenomenon, particularly in terms of the impacts potentially affecting the whole community, in Italy this critical vision is still quite uncommon, while public opinion and most of the political representatives are still largely unaware of the negative consequences caused by land abandonment and forest expansion. On the contrary, this research underlines all of the negative impacts, thus contributing to spread a more critical and proactive approach to the phenomena;
- *The approach* - While several sectorial studies have been recently undertaken concerning specific aspects of mountain depopulation, agricultural decline, land abandonment and forest expansion, a broad and interdisciplinary overview of the phenomena had never been undertaken so far;
- *The methodology* - The processes of farmland abandonment and the consequent spontaneous forest expansion have been analysed through the DPSIR assessment and reporting framework, which had never been applied to these specific topics, while it found very little and marginal application as regards mountain related issues as a whole (see following Paragraph).

1.4 – The overall framework: contents of the thesis

The thesis is overall organised into three main sections. The contents of each section will be described in Paragraph 1.4.2. Yet, in order to properly depict section two, representing the core of the thesis, it is firstly necessary to spend a few words on the structure this section is based on, i.e. the DPSIR scheme. Indeed, this is the framework which was adopted for analysing and describing the processes of farmland abandonment and the consequent spontaneous forest expansion throughout the research.

1.4.1 – The DPSIR assessment and reporting framework

DPSIR stands for Driving forces, Pressures, State, Impacts and Responses. According to the European Environment Agency (EEA), DPSIR can be defined as "*the causal framework for describing the interactions between society and the environment*", which has been officially adopted by the Agency (EEA, 2005). The Driving Forces-Pressures-State-Impacts-Responses assessment and reporting framework represents an extension of the Pressures-State-Responses (PSR) model developed by the Organisation for Economic Co-operation and Development (OECD) and offers a basis for analysing the inter-related factors that exert some impact on the environment.

As visualised through Figure 1.5, the DPSIR model has the form of a chain of links, from the causes of environmental problems to their impacts, and society's responses to them in an integrated way. The framework assumes cause-effect relationships between interacting components of social, economic and environmental systems, which are, respectively, *driving forces* of environmental change, *pressures* on the environment, *state* of the environment, *impacts* on society, economy and ecosystems and finally *responses* of the society.

More precisely, *driving forces* may be defined as the social and economic developments which, combined with environmental conditions, underpin environmental change, positively or negatively. This category usually includes:

- past driving forces, which still exert influence on the current state;
- current driving forces;
- predicted future trend in driving forces in the short, medium and long term;
- the geographic location and extent of influence of driving forces.

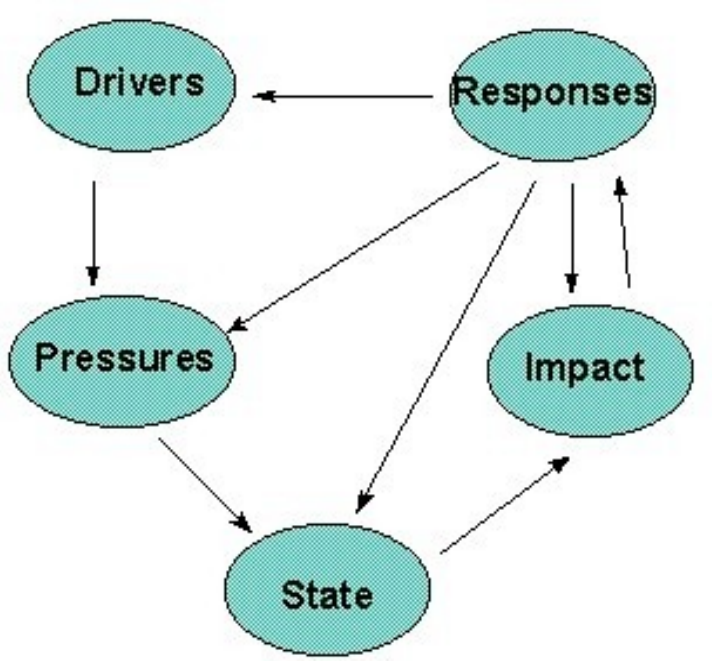

Figure 1.5 - The DPSIR framework for assessment and reporting. Source: EEA, 1999b

Such human influences and activities directly or indirectly exert *pressures* on the functionality and quality of the system or resource (e.g. overexploitation of natural resources or, on the contrary, abandonment of human-dependent ecosystems). This category usually includes:

- synergistic or cumulative pressures resulting from diverse driving forces;
- the spatial scale of the pressure;
- the expected future trend in pressures in the short, medium and long term, in terms of direction and magnitude.

As a consequence, the current *state* of the environment changes, in terms of quantitative and qualitative provision of adequate conditions for health, resources availability and biodiversity, amenity and financial value. This category usually includes:

- a description of the current state;
- recent trends in resource or system health;
- the geographic extent and the scale of the problem.

This leads to *impacts* on human health, ecosystems and materials, which are the effects of, or environmental responses to, pressures on the current state. This category usually includes:

- changes in quantity and/or quality of the resource or system;
- changes in functionality of systems;

- knock-on effects on other systems or resources (including social and economic systems);
- synergistic or cumulative environmental impacts;
- the time frame of the impacts (i.e. short, medium or long term);
- the spatial extent of the impacts.

Finally, *responses* are society's responses to environmental changes and concerns, i.e. the efforts (e.g. policy measures, planning actions) provided to solve the problems identified, by mitigating, or adapting to, negative impacts on the environment, by halting or reversing environmental damage already inflicted, or by preserving and conserving natural resources. The *responses* feed back on the *driving forces* or on the *state* or *impacts* directly, through adaptation or curative actions (EEA, 1999b; Mangold *et al.*, 2002; Feás Vázquez, 2003).

The DPSIR framework, which was originally developed by the EEA for environmental reporting purposes, has been increasingly being applied to broader issues and it is particularly suitable for analysing complex systems such as sustainable development related processes.

Yet, despite the broad use of the DPSIR framework and its adoption by many important European institutions, a reference document with thorough theoretical and methodological presentation of such an approach has yet to come (Giupponi, 2002). Given the lack of a unique definition, different interpretations are possible and equally plausible, which might even lead to contradictory attributions of the same indicators to the five components.

1.4.2 – Contents

As already mentioned, the thesis is overall structured into three sections. The first section, including Chapter 1 and 2, provides background information and introduces sustainable mountain development related issues by stressing the importance of mountains at global level, the process of raising global awareness about the "mountain issue" and the main global and regional initiatives dealing with mountain ecosystems and communities.

Section two – from Chapter 3 to Chapter 8 – represents the core of the thesis. It is based on the first ever attempt to apply the DPSIR framework to the processes of marginalisation, farmland abandonment and the consequent forest expansion, which together represent the focus of the

research[1]. To start with, Chapter 3 describes the main driving forces leading to the phenomenon of land abandonment, which might all be traced back to the broad process of marginalisation, which in turn can be distinguished into two different processes, namely geographical and sectorial marginalisation.

Land abandonment is not the only possible consequence of marginalisation. Indeed, two opposite, yet specular, processes may be determined by marginalisation: productive intensification on the one hand and extensification of agricultural activities on the other hand. Where greater agricultural productivity is not possible or does not appear as a viable option, a gradual running down of farming activities is likely to occur. Nowadays, intensification and abandonment are the main pressures in the landscape shaping process of rural mountain areas in large part of Europe, representing major threats to biodiversity and cultural landscapes. Intensification and extensification trends, together with the process of agricultural decline leading from extensification to abandonment, are described in Chapter 4.

The main trends driven by marginalisation processes are demographic trends and particularly depopulation - which is primarily caused by geographical marginalisation, - and the running down of the less competitive forms of agriculture and the neglect of farmland, mainly due to agricultural marginalisation. Such a land use change from cultivated or otherwise managed land to abandoned territories gives rise to land cover changes, namely the invasion of shrubs and trees into farmland and, after all, a process of natural succession, which finally results in forest expansion.

Therefore demographic trends, decline of mountain farming and forest expansion have been considered as being particularly representative of the state of the environment as regards the phenomenon of land abandonment in the Alps. Statistics describing these trends with regard to the Alpine arch as a whole and the Italian Alpine regions in particular are reported in Chapter 5.

In Europe, many of the most valuable areas for wildlife are those which have been settled and farmed for many centuries, in which species have co-evolved with traditional agricultural management and where landscapes are dependent upon regular management for their variety and interest. Beyond environmental impacts, also social and economic consequences caused by farmland abandonment and the consequent forest expansion are described and analysed in Chapter 6.

[1] Although some small-scale attempts have been made to apply the DPSIR framework to interactions in mountain areas as a whole (EEA, 1999a) or to certain particular aspects here considered, such as the identification of the habitats depending upon transhumance, carried out within the TRANSHUMOUNT project (Bunce *et al.*, 2004), so far no significant systematic and extensive endeavours have been made in this sense.

Finally, the responses implemented by society in order to directly or indirectly influence these processes are illustrated in Chapter 7, where the main policy tools currently available at European level are classified according to what they influence the most among driving forces, pressures, state or impacts (see Figure 1.5).

Farmland abandonment and forest expansion might be perceived in different ways, depending on several factors, e.g. the observer's point of view and the time frame considered (Piussi and Pettenella, 2000). In particular, two opposite outlooks gather most of the consent: the "*laissez faire*" approach, characterised by an overall positive view of the phenomena, on the one hand, and a more critical and proactive attitude based on the conviction that the current trends need somehow to be counteracted, on the other hand. These two opposite visions are described in Chapter 8.

Section three takes into consideration some possible solutions to the problem of farmland abandonment, as they have been implemented in different contexts. Chapter 9 describes the Austrian way of solving the problem, stressing in particular the effectiveness of a thirty-year policy of support to mountain farming and the reasons for it to be successful. Chapter 10 proposes a totally different way of counteracting forest expansion, i.e. by land use management.

The main goal is to identify the key-principles to adopt in order to realise effective strategies aimed at addressing marginalisation-related trends by preventing them or counteracting their effects, on the basis of the analysis and assessment of the policy and planning measures so far described.

The good practices described and analysed in Chapters 9 and 10 have been studied during two research periods abroad, namely at the *Federal Institute for Less-Favoured and Mountainous Areas (BABF)* in Vienna, Austria (from the 10th of January to the 3rd of May 2005), and the *Macaulay Land Use Research Institute* (MLURI) in Aberdeen, Scotland (from the 30th of May to the 22nd of July 2005).

Finally, Chapter 11 draws the conclusions.

CHAPTER 2 – SUSTAINABLE MOUNTAIN DEVELOPMENT

The concept of Sustainable Mountain Development was mentioned for the first time at the World Summit on Sustainable Development held in Rio in 1992. Since then, the process of raising global awareness about the so-called "mountain issue", i.e. the importance and the intrinsic fragility of mountain ecosystems, has been going on by means of both intergovernmental and non-governmental initiatives.

Several documents have thus been proposed focusing on the mountains as a whole as well as on certain specific topics, such as mountain populations or conservation of natural resources. Yet, most of them are not-binding documents.

However, first of all a definition of what has to be meant by "mountain areas" is necessary, in order to understand their key-role both at global and local level and the importance of mountain-lowland interactions, especially in terms of water management.

2.1 – Mountains: a definition

A crucial issue for any policy aimed at mountain areas is their definition. There are currently a number of different definitions of mountain areas, but none of them is accepted universally and none is applied systematically (CoR, 2003).

The main features which distinguish upland areas from other disadvantaged regions are their particularly harsh climate and topography. For this reason altitude, slope and climate remain the most common criteria utilised for identifying mountains (ESC, 2003). Although opinions diverge on how mountain regions should be defined in relation to altitude, there is general consensus that they are areas with steep slopes and marked topographic relief (Price and Messerli, 2002).

The most important efforts for classification of mountain regions are to be found within legislation, while this matter seems to be significantly less important for academic research. Indeed, the necessity of identifying limits for the definition of mountain areas mainly raises from the need of defining areas which are eligible for receiving agricultural subsidies because of limits on productivity.

However, even under Community law there is no uniform concept of upland or mountain areas: the first definition was set by Directive 75/268/EEC of 28 April 1975 "on mountain and hill farming and farming in certain less-favoured areas", with the purpose of identifying potential

beneficiaries for the compensatory allowance for permanent natural handicaps. Directive 75/268/EEC defined mountains as those areas, which are "*characterised by a considerable limitation of the possibilities for using the land and an appreciable increase in the cost of working it, due:*

- *either to the existence, because of the altitude, of very difficult climatic conditions […];*
- *or, at a lower altitude, to the presence […] of slopes too steep for the use of machinery or requiring the use of very expensive special equipment;*
- *or, finally, to the combination of these two factors, where the handicap resulting from each taken separately is less acute, provided that this combination gives rise to a handicap equivalent to that caused by the situation referred to in the first two indents*" (art. 3).

Member States were invited to communicate to the Commission, on the basis of these indications, the boundaries of the areas in which they proposed to apply the special system of aids provided for (art. 2) (see Figure 2.1). Since Member States were given a considerable autonomy in setting detailed parameters for applying the criteria specified by Directive 75/268/EEC, as a consequence quantitative and qualitative divergences and significant discrepancies between Member States remain to this day (EESC, 2003).

For example, thresholds are generally higher in the most mountainous countries (Nordregio, 2004), while they are lower in countries at higher latitude, where harsh climatic conditions and short growing seasons can be found even at low altitudes[1]. Yet, some differences are more difficult to explain: while in France and Germany the threshold limit is 700 metres, the altitude limit in Spain is 300 metres higher. Even bigger are the differences concerning the slope indicator, which is taken into account by France, Spain and Italy (France and Spain fix the minimum gradient at 20%, Italy does not quantify the slope), while in Germany this indicator is not considered at all (EESC, 2003).

Directive 75/268/EEC was later repealed by Council Regulation (EC) No 950/1997 of 20 May 1997 "on improving the efficiency of agricultural structures"**,** which in turn was replaced by Council Regulation (EC) No 1257/1999 of 17 May 1999 "on support for rural development from the European Agricultural Guidance and Guarantee Fund (EAGGF)": both these documents reaffirm exactly the same definition of mountain areas as stated by Directive 75/268/EEC, in art. 23 and art. 18 respectively.

[1] The accession treaties placed Sweden and Finland north of the 62nd parallel on a par with upland areas, on the grounds that the problems and conditions of these regions are the same as in upland areas (EESC, 2003). Council regulation (EC) No 950/1997 states that these areas are to be included as moutain areas in so far as they are subject to very difficult climatic conditions the effect of which is substantially to shorten the growing season (art. 23).

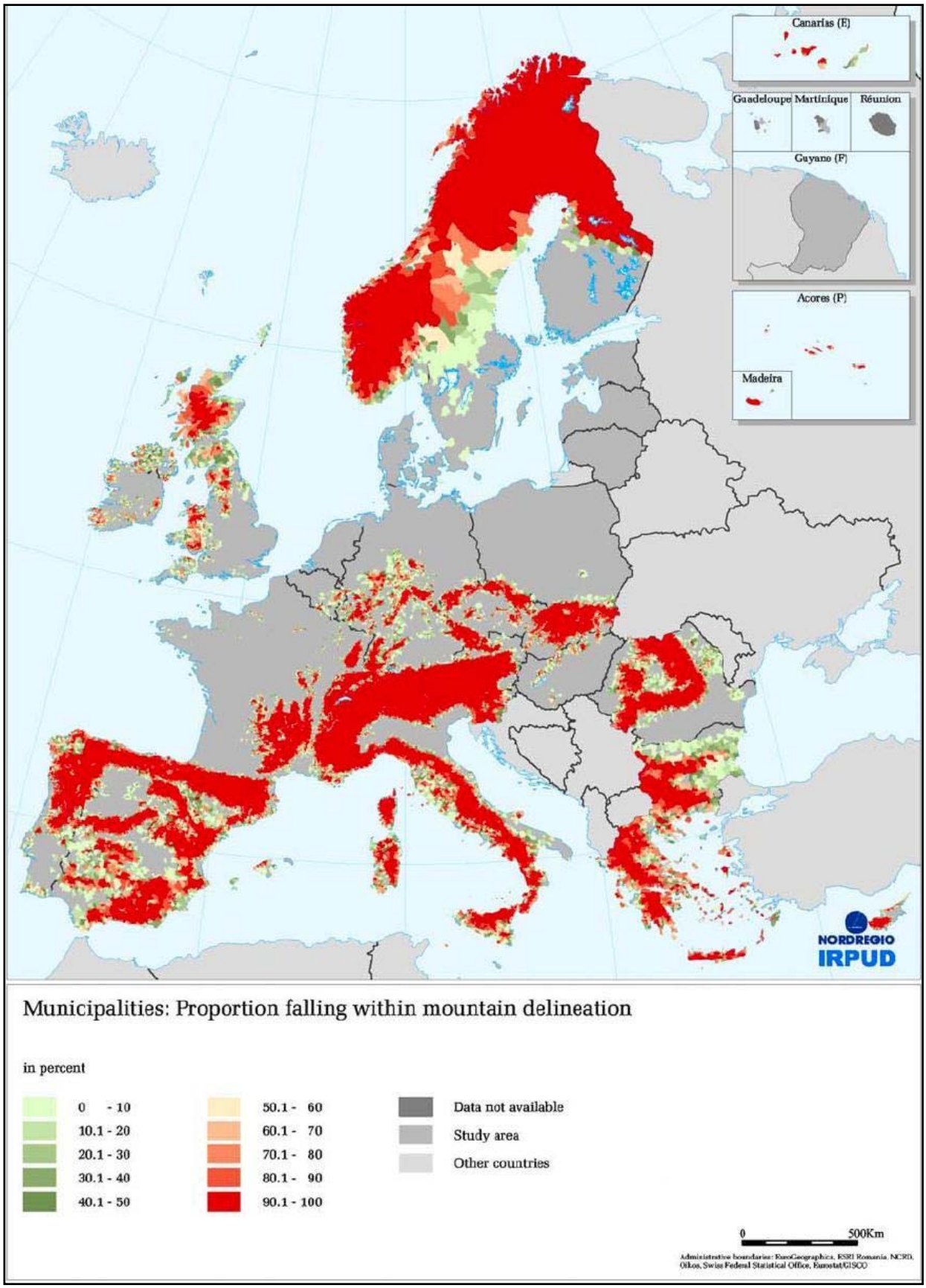

Figure 2.1 – Proportion of municipalities falling within mountain delineation. Source: Nordregio, 2004

Once again these regulations draw up the general classification criteria, without attempting to specify a minimum threshold which Member States are required to respect, which means that it is up to national or even regional governments to set their own limits. Regarding the altitude, this is usually set to be over 600 metres above sea level, while the minimum slope is identified in an average of 20% per km^2 (CoR, 2003). Table 2.1 gives the criteria for the definition of mountain areas in some EU Member States.

Member State	Minimum elevation	Other criteria
Austria	700 m	Also above 500 m if slope >15%; below 500 m if slope >20%
Belgium	300 m	
France	700 m (generally) 600 m (Vosges) 800 m (Mediterranean)	Slope >20% over 80% of the area
Germany	700 m	Climatic difficulties
Greece	800 m	Also above 600 m if slope >16%; below 600 m if slope >20%
Ireland	200 m	
Italy	600 m	"Steep" slopes (not specified); altitudinal difference >600 m;
Portugal	700 m (north of the Tejo river) 800 m (south of the Tejo river)	Slope >25%
Spain	1000 m	Slope >20%; altitudinal difference >400 m
UK	240 m	--

Table 2.1 - Criteria for definition of mountain areas in some EU Member Countries. Source: Nordregio, 2004

In Italy, mountain areas were firstly defined by Act 991 of 1952, "on woods, forests and mountain areas", which adopted altitude as the main criterion for their classification, mainly for administrative purposes. Act 991 considered as mountainous those municipalities having at least 80% of their area over 600 metres above sea level, as well as any territory having difference in altitude of at least 600 metres (art. 1). A few years later, Act 657 of 1957 also included those municipalities which, although not meeting the altitude criteria, faced similar agro-economic conditions (Villeneuve *et al*., 2002). Following Act 657 an increasing number of municipalities met such wider criteria, so that, by the end of 1994, 4,194 municipalities, involving 54% of the

national territory, could be defined as mountainous[1] (Maglia and Santoloci, 1998; Piussi and Pettenella, 2000). In 1990, Act 142 repealed art.1 of Act 991 of 1952: while the former classification criteria were cancelled, no other criteria were set. Yet, in 1995 the Home Affairs Minister together with the Agriculture Minister decided to fix the number of municipalities already classified as mountainous at that date for ever (*ib.*).

Yet, from many parts a demand for a more standardised concept of upland areas has been risen, by specifying a range for each of the criteria usually identified, or at least for altitude and slope (EESC, 2003). On the other hand, it was also suggested that mountains are more broadly defined, not only identifying physical criteria but also using social and environmental indicators (Nordregio, 2004). In particular, beyond the natural handicaps, also the socio-economic disadvantages such as low population density, isolation and remoteness should be taken into account (EESC, 2003). Yet, we shall not forget that most of the areas affected by such difficulties are already included within the broader concept of "Less-favoured areas", while a more precise and stricter definition for mountain areas from a legislative point of view is opportune.

While legislations do require precise and detailed delimitations of mountain areas, a broader delineation taking into account also the relationships between uplands and lowlands, particularly through water resources management, would be appropriate from an academic point of view. In this case, mountain environments should not be distinguished just on the basis of some technical criteria such as their physical features, while a more integrated and comprehensive definition is plausible, possibly based on an ecosystemic approach. In particular, the concept of mountain-lowland interaction should be more strongly developed by scientists, who on the contrary tend to focus on the processes of either mountains or lowlands (Price *et al.*, 1998).

For the purposes of this research, an appropriate definition of mountain area is the one provided by the Economic and Social Committee of the European Union, which proposes to define an upland area as "*a physical, environmental, socio-economic and cultural region in which the disadvantages deriving from altitude and other natural factors must be considered in conjunction with socio-economic constraints, spatial imbalance and environmental decay*" (EESC, 2003).

[1] Official definition of mountain areas according to the national legislation differs from the National Statistical Bureau (ISTAT) delimitation, since ISTAT classifies as "mountain" those areas located at an altitude higher than 600 m a.s.l. in the Alps and 700 m a.s.l. in the Apennines. Consequently, according to ISTAT only 35.2% of national territory is classified as mountain area, while according to UNCEM, the National Union of Mountain Municipalities and Communities, 54% of national territory can be considered as mountainous, both because of the different criteria applied and because the UNCEM classification also includes those municipalities whose territory, although not completely mountainous, is included within a "Comunità Montana", the consortia of mountain municipalities established by Act 1102 in 1971 (Villeneuve *et al.*, 2002).

Within this broader definition, covering the whole range of geophysical, climatic, ecological and socio-economic situations that form European uplands, a further distinction between "predominantly" upland areas (regional or local authorities where over 66% of the territory meet these criteria) and "partially" upland areas (where between 33% and 66% of the area is upland) is also suggested (*ib.*).

2.2 – Sustainable Mountain Development and the process of raising global awareness on the "mountain issue": documents, conferences and institutions

2.2.1 – The first steps: the United Nations Conference on Environment and Development (UNCED) and the concept of Sustainable Mountain Development (SMD)

The first research programmes on mountain ecosystems already initiated during the seventies, including the UNESCO's Man and Biosphere (MAB) Project No. 6, *Impact of Human Activities on Mountain and Tundra Ecosystems* (1973)[1] and the United Nations University's (UNU) Programme on *Highland-Lowland Interactive Systems* (1977). These initiatives came together with the foundation of several institutions, such as the International Geographic Union's (IGU) Commission on Mountain Geo-ecology and Resource Management (1968), the International Mountain Society (IMS) (1980), which still produces the scientific periodical *Mountain Research and Development*, and the International Centre for Integrated Mountain Development (ICIMOD), primarily aimed at coordinating networking in Asia and the Pacific (1983) (Price, 1998). At European level, one of the first initiatives specifically targeting mountain rural areas was the *Less Favoured Areas Directive* (75/268/EEC), aiming at compensating less-favoured production and living conditions in mountain areas.

Yet, the profound gap between the stable and unchangeable appearances of the mountains and their intrinsic fragility was firstly recognized by the so-called "*Mountain Agenda*", a small group of development experts and academicians who had previously been involved in the activities of the MAB-6 Project, the IGU's Commission on Mountain Geo-ecology and Resource

[1] The Man and Biosphere (MAB) Programme was launched by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) in 1972, with the aim of improving the global relationship between people and the environment and stimulating a rational use and conservation of the resources of the biosphere. One year later the Programme had initiated, a team of experts met in Salzburg (Austria) to discuss the "impact of human activities on mountain and tundra ecosystems". The main outcome of this early initiative, which was the first international interdisciplinary research programme on mountain regions (Price, 1998), was the introduction of a uniform and consistent methodology for research on mountain ecosystems within the framework of an intergovernmental scientific programme, thus improving the comparability of studies carried out in different regional contexts (Schaaf, 1999). By the end of 1999, more than 40% of the 352 Biosphere Reserves (protected areas where the conservation of ecosystems and their biodiversity is combined with the sustainable use of natural resources for the benefit of local communities) were located in mountain regions (*ib.*).

Management, ICIMOD, IMS and UNU (Price, 1998). The Mountain Agenda, with the support of the Swiss Agency for Development and Cooperation (SDC), prepared a document on the occasion of the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in June 1992, "*with the purpose of raising the status of mountains on the worlds' development and environment agenda*" (Mountain Agenda, 1992).

Such a document, entitled *An Appeal for the Mountains*, stated that "*the mountains are colossal masses of inert rock, remote, durable and to all intents and purposes, apparently eternal. These images have made political leaders and decision makers who live in the plains, where the big cities and national capitals have grown up, to a large extent blind to the degradation of the mountains and to the increasing impoverishment of their inhabitants*" (*ib.*).

The *Appeal for the Mountains* was submitted to the representatives of the countries taking part in the Earth Summit in order to raise their awareness about the importance of mountains and mountain ecosystems, together with the main threats they were facing at that time and the necessity of paying "*immediate attention*" to such crucial topics.

The Mountain Agenda's call did not go unheard, as the vulnerability of mountains as well as the need for a global strategy towards a sustainable development of mountain areas were acknowledged in Chapter 13 of Agenda 21 – the plan for action endorsed by the Heads of State or Government gathered at the UNCED – the meaningful title of which was "*Managing Fragile Ecosystems – Sustainable Mountain Development*".

Even though Chapter 13 has not had as large echo as other global topics raised by the first World Summit for Sustainable Development (WSSD), such as climate change, biodiversity loss, desertification and the call for a broader public participation in decision – making process at local level (as intended by Chapter 28, the so-called Local Agenda 21), nevertheless for the first time mountain issues were ascribed global relevance and, although just theoretically, equal priority, in the international agenda, with other worldwide topics (Dax, 2002).

A further novelty introduced by the document was the preference given to a multi-sectorial approach, which contrasts with the previous studies on the problems and needs of mountain areas, mainly implemented within sectorial contexts (Price and Kim, 1999).

Moreover, Chapter 13 contains the first ever mention of the term "Sustainable Mountain Development" (SMD), which may roughly be described as the application of the broader concept of sustainable development to mountain issues. Yet, contrary to what one might be expecting, and unlikely the "over-defined" concept of sustainable development, Chapter 13 does not provide any

definition of this concept, nor other attempts to define it were ever made by the subsequent plans and documents which discussed and used this concept.

However, we might reasonably claim that the idea of sustainable mountain development should go beyond the simple transfer of the concept of sustainable development into mountain contexts, while implying peculiarities and features of such a specific theme. Indeed, "*because of their special character and environmental and social importance, mountain areas cannot be treated in the same ways as other rural areas, but require a specific strategy geared to their own environment, economic and social characteristics*" (European Parliament, 1998); likewise, the major current problems with sustainable development are even more difficult in the case of mountain areas (Committee on the Environment, Agriculture and Local and Regional Affairs of the Parliamentary Assembly of the Council of Europe, 2003b).

Another crucial aspect of sustainable mountain development is that, along with sustainable development itself, the three pillars – environment, society and economy – need to be taken into account. Although obvious to some extent, this aspect should always be kept in mind, since the approach to mountain issue still tends to be sectorial.

To give an example, in 1998 a survey was conducted by Price and Kim among more than one hundred European researchers, policy makers and members of NGOs, who either were members of the *Mountain Forum* or they had taken part in the sessions of the *European Inter-Governmental Consultation on Sustainable Mountain Development* and the *European Non-governmental Consultation*, all held in 1996. The results of the survey showed that ecological priorities were generally perceived as more important than socio-political or economic variables, which tended to be given lower priority (Price and Kim, 1999).

However, according to Price and Kim, we might suggest that a precise definition of sustainable mountain development is probably even unnecessary, while it is fundamental to recognize that "*it is a regionally-specific process of sustainable development that concerns both mountain regions* and *populations living downstream or otherwise dependent on these regions in various ways*" (*ib.*)[1].

2.2.2 – Why do mountains matter?

To better explain the previous fundamental observation, the *State of the World's Mountains*, a report edited by Stone on behalf of the Mountain Agenda in 1992, suggests the image of a

[1] This "definition" was also adopted by the FAO, which included it in the *International Year of Mountains: Concept Paper* in 2000.

metaphorical village, comprising 1,000 inhabitants and 1,000 units of land, 200 of which lie at over 1,000 metres above sea level and are mostly rugged and steep. While only about one tenth of people live in the mountainous area of the village, half of the population depends in some way on the upper land. From there, the major village streams flow down providing water resources and hydroelectric power. Most of the community's timber and fuel wood is brought down from these areas and many families from the lowlands go to the upper areas on festival to enjoy the variety of wild animals and plants, which is much bigger today than in the lower areas, where pollution and land consumption caused by human activities have seriously altered their ecosystems. The upper wards of this metaphorical village are indeed pillars of the economy and culture of the whole community (Stone, 1992).

This simple metaphor is useful to give an idea of the local and global significance of mountain ecosystems and particularly of their importance for downstream communities, who mainly depend on the upstream environmental services such as supply of reliable quantities of high-quality water and disaster prevention (Bieberstein Koch-Weser and Kahlenborn, 2004).

The metaphor is obviously based on real data: mountains cover 24% of the world's land surface, providing a direct life-support base for about one-tenth of humankind[1] as well as goods and services to more than half the world's population (Ives, 1992; Price *et al*., 1998; Price, 2004). As far as the European Union is concerned, mountain regions cover 30% of EU-25 territory, while in six member countries, including Italy, mountain areas cover even more than 50% of the territory. Moreover, in 2002 about 20% of the Utilised Agricultural Area was defined as mountain area and 27% of the farms were situated in mountain territories (Dax, 2002).

The *incipit* of Chapter 13 of Agenda 21 states that "*mountains are an important source of water, energy and biological diversity. Furthermore, they are a source of key resources as minerals, forest products and agricultural products and of recreation. As a major ecosystem representing the complex and interrelated ecology of our planet, mountain environments are essential to the survival of the global ecosystem*" (UNCED, 1992a).

The mountains' greatest value, particularly at the European scale, is probably as "water towers" (Nordregio, 2004), since water resources provided by mountains cover the most vital functions of mountain and lowland people (EEA, 1999a). The document *Mountains of the world:*

[1] For many years, it has been estimated that one-tenth of the world's population lives in mountain areas. Yet, since there is no widely accepted definition of mountains, it is difficult to estimate the exact percentage of people living in them. According to a recent study, for example, 26 percent of the world's population is estimated to live in or close to mountain areas (Price and Messerli, 2002).

Water Towers for the 21st Century highlights the paramount importance of mountains for water supply and figures out the prominent role they will play in sustainable development in the next future, due to the increasing demands on limited water resources, resulting in a growing potential for conflicts (Mountain Agenda, 1999).

More than half of humanity relies on the fresh water – for drinking, domestic use, irrigation, hydropower, industry and transportation – that accumulates in mountains, where all the major rivers in the world have their headwaters. Mountain areas represent a relatively small proportion of river basins, while providing the greater part of the river flows downstream. In humid climates, the proportion of water generated in the mountains can comprise as much as 60% of the total fresh water available in the watershed, while in semi-arid and arid regions this proportion can rise up to 95%. As regards the Alps, 32% of the surface of the Rhone River Basin is covered by mountain areas, providing 47% of the lowland flow, while the 32% mountain watershed of the River Po contributes to 56% to the lowland flow (*ib.*).

Even though sustainable water management and prevention of floods and landslides depend in large measure on the ways in which upstream water sources and soils in mountain areas are protected, upstream dwellers do not usually receive any compensation for the environmental services provided by their territory in terms of water supply and mitigation or prevention of natural hazards. Downstream populations have no tradition of negotiating environmental safeguard with mountain dwellers, nor do the latter ones take the value of such environmental services into account. Governments who pay for upstream environmental services may be interested in protecting the environment, respond to public pressure or try to avoid higher costs.

Yet, to date only a few cases can be found worldwide in which the tool of Payment for Environmental Services (PES) or analogous instruments have been applied to downstream-upstream cooperation and water resources in particular (Bieberstein Koch-Weser and Kahlenborn, 2004). Yet, it is likely that mountains will increase their importance as water towers for human consumption and that the mechanisms of compensation for the supply of high-quality water will play a pivotal role in the next future, while representing a key aspect in the path towards sustainable mountain development, with particular regard to Developing Countries.

On this purpose, significant is the relevance ascribed by the respondents to the survey conducted by Price and Kim to compensation for sustainable management of mountain territories by downstream population, which stresses the need for mountain people to be adequately compensated for providing goods and services to much larger communities (Price and Kim, 1999).

For all these reasons, mountains' long term environmental health is of vital importance to dwellers in the lowlands as well as to the inhabitants of the mountains themselves. It is mountain communities' management of natural resources on the mountain slopes which determines the manner in which water is available for development in the lowland communities (Mountain Agenda, 1992). It was such a reflection which brought about a call – once again contained in the *Appeal for the Mountains* – not to ignore the crumbling of mountains, as too often this has been the prelude to the crumbling of the downstream economy (*ib.*).

At both continental and regional scale a second key value of Europe's mountains is as centres of biodiversity (Nordregio, 2004). The greatest diversity of vascular plant species occurs in mountains (Price, 1998) and two-thirds of Europe's flora are found predominantly or completely in mountain areas[1] (EEA, 1999a). Moreover, 42 of the 169 habitat types in Annex 1 of the Council Directive 92/43/EEC (the so-called "*Habitats Directive*") are in mountain areas (Hopkins, 1998). The high level of biological diversity is actually one of the reasons why almost a quarter of the world's protected areas are in mountain regions (Price, 2004).

The alpine zones of temperate mountain areas contain large proportions of endemic species that are confined either to specific mountain tops or groups of mountains (CBD, 2002). Biodiversity in mountain areas comprises both natural and cultivated species, the latter being usually referred to as "agrobiodiversity" (Price *et al*., 1998) or "cultivated biodiversity". Because mountain terrain is topographically diverse, there is a high microhabitat diversity that, in turn, favours high levels of agricultural species diversity (CBD, 2002).

Indeed, mountains are also important as centres of crop diversity (Price, 1998), since many mountain species are edible, including the precursors of many of the world's major food crops, among which corn or maize, as well as many medicinal plants and non-wood forest products (Price and Messerli, 2002).

Several factors contribute to such a great variety, among which the high variety of conditions at different altitudes, on different slopes and in diverse microhabitats (Price and Messerli, 2002). Moreover, as lowlands have been deeply modified by commercial agriculture, industry and urban settlement, the last stronghold of nature is often in the mountains (Mountain Agenda, 1992). While intensive land use throughout almost all of Europe has led to the destruction of several habitats and the consequent extinction of numerous species, the Alps have become an important refuge area for a variety of European species (Stone, 1992).

[1] As mentioned in Paragraph 1.3, according to a WWF report on biodiversity in the Alps, the Alpine arch hosts about 30,000 animal and 13,000 plant species, 4,500 of which are vascular plant species, corresponding to 39% of Europe's flora (WWF, 2004). For this reason the Alps have been identified as one of the 238 priority ecoregions by WWF.

While the existence of many species depends mainly on the occurrence of these specific biophysical factors, some mountain habitats, such as meadows and pastures maintained by haymaking and grazing, are the result of human activities and require continued human intervention to be maintained (Nordregio, 2004) (this topic will be discussed more into details in chapter 6.1).

2.2.3 – The inter-governmental and non-governmental consultations after the first World Summit on Sustainable Development (WSSD)

Chapter 13 of Agenda 21 represents just the first step of a long-term process of raising public awareness and encouraging adequate political and institutional commitment for what has been called the "mountain issue" (FAO, 2000). Since the Rio Earth Summit in 1992, the importance of mountain regions has increasingly been recognized in science and policy initiatives at all scales. In particular, under the aegis of the UN Food and Agriculture Organisation (FAO) – which was appointed by the UN Inter-Agency Committee on Sustainable Development as Task Manager for Chapter 13 of Agenda 21 in September 1993 – regional *Inter-Governmental Consultations on Sustainable Mountain Development* have been held (Price *et al*., 1998).

Between 1994 and 1996 a series of inter-governmental meetings were held in most parts of the world (Europe, Africa, Asia and the Pacific, Latin America and the Caribbean), involving representatives of 62 countries plus the European Union. In Europe two sessions were held in 1996 (Price and Kim, 1999; Price and Messerli, 2002). The document resulting from these two sessions, held in Aviemore (Scotland) and Trento (Italy), underlines the main threats faced by European mountains, such as depopulation and environmental decay. In particular, demographic changes are recognized as processes affecting not only mountain societies, but also mountain environments, implying as consequences: shift in land use, land abandonment, an increase in fallow land and finally the return of scrub and forest.

Once again, the role played by mountain communities for the benefit of the whole society is highlighted, in particular in terms of management of natural resources, heritage and landscapes. It is thought that this recognition will give an economic value and justify the costs to society for providing basic infrastructure and services for improved quality of life in the mountains (European Intergovernmental Consultation on Sustainable Mountain Development, 1996).

Parallel to the inter-governmental process, a non-governmental process was taking place. Progress in creating greater awareness of the "mountain issue" and improving coordination of

initiatives to protect fragile mountain ecosystems and promote sustainable mountain development has been achieved largely as a result of the efforts provided by several international and regional institutions, partnerships and non-governmental organizations (NGOs), which have provided focus on key mountain issues and led to recommendations significant at both global and regional levels (UNCSD, 1997).

One of the most important is the *International Commission for the Protection of the Alps* (CIPRA), a non-governmental organisation founded in 1952, whose efforts finally led to the approval of the *Convention on the Protection of the Alps* signed in 1991 (see Paragraph 2.3.4). Several other regional agreements and fora have been implemented since then, such as the *Charter for the Protection of the Pyrenees*, the *Carpathian Ecoregion Initiative and* the *Alpine Forum*, established in the years 1994-1995.

The conclusions and recommendations from the *European NGO consultation on Sustainable Mountain Development* held in Toulouse (France) in 1996 provided inputs to the ongoing process of formulating a draft *Charter for European Mountain Regions* by the Council of Europe (European NGO Consultation on Sustainable Mountain Development, 1996) (see Paragraph 2.3.2). Likewise, an international non-governmental consultation held in Lima (Peru) in 1995[1] led to the establishment of the *Mountain Forum*[2], a global network in support of mountain cultures, environments and sustainable development, involving non-governmental, inter-governmental, scientific and private sector organisations and individuals (Price and Kim, 1999).

Moreover *Euromontana*, the European association for co-operation between mountain territories established in 1953, has achieved legal identity since 1996, in order to improve the efficiency of its action.

Within the European research context, an important event was the *European Conference on Environmental and Societal Change in Mountain Regions*, organised by the *Mountain Regions Programme of the European Network for Research on Global Change* (ENRICH) and held in Oxford in 1997. While in the past research for rural areas had been dominated by agricultural topics, the Oxford Conference stressed the fundamental role played by other economic and social dimensions of rural change and development, underlying the need and opportunity for integrated interdisciplinary research especially focusing on processes of change in interacting environmental and societal systems, such as the gradual and rapid changes in mountain landscapes.

[1] 110 participants from 40 different countries took part in the global non governmental conference held in Lima in 1995.

[2] With major financial support provided by the Swiss Government, the Mountain Forum, created in 1995, operates primarily as a decentralised structure with regional focal points established to coordinate networking activities (UNCSD, 1997). By the end of 2001 the Mountain Forum had over 2700 individual and 170 organisational members in more than 100 countries (Price and Messerli, 2002).

On this purpose, the *Report of the Oxford Conference* also points up the need to direct economic forces towards a new balance between production and the provision of societal benefits, among which a stable and attractive landscape is explicitly mentioned[1]. Among the key-themes for action to sustain the future of mountain communities and their environment, mountain-lowland interactions, sustainable agriculture and forest management and development were identified (Price *et al*., 1998).

In 1997 FAO, on behalf of the United Nation Commission on Sustainable Development (UNCSD), prepared a report reviewing progresses made in the implementation of the objectives set out in Chapter 13 of Agenda 21 (*UNCSD Secretary General's Report on Chapter 13*). Although relatively few activities initiated directly as a result of Chapter 13 were identified, among the successes achieved since 1992 an overall increasing recognition of the importance of mountain areas in terms of biodiversity conservation, economic potential and protection of downstream interests and a general improving coordination of efforts to protect fragile mountain ecosystems and promote sustainable mountain development were listed.

These results were mainly testified by the numerous international and regional intergovernmental and non-governmental consultations held in those years and the establishment of several organisations, institutions and networks specifically operating in the field of sustainable mountain development (see Paragraph 2.2.5). Such a greater recognition of mountain areas as special and distinct from lowland areas was thought as the main driving force leading to a change of attitude of governments, intergovernmental organisations and NGOs to pay greater attention to conservation and development of mountain areas, which had historically been neglected.

Yet, most conservation and development programmes in mountain areas implemented at that time were identified as containing specific components aimed at improving databases on biological resources, while economic, sociological and cultural information was still largely unavailable.

On the other hand, several objectives of Chapter 13 were recognized as unfulfilled, or at least having seen little or no progress towards implementation, such as institutional arrangements at national level (UNCSD, 1997).

[1] This observation represents an important step towards the more recently developed concept of multifunctional agriculture, which considers agriculture as an activity which does not only produce food and fibre, but also provides common benefits such as landscapes, biodiversity, cultural heritage and viable rural communities (Brouwer, 2004).

2.2.4 – The International Year of the Mountains (IYM) and the second World Summit on Sustainable Development (WSSD)

A further, crucial step in the process of increasing global awareness about the "mountain issue" was the year 2002, proclaimed as International Year of the Mountains (IYM) by the General Assembly of the United Nations in 1998[1]. The IYM was meant to represent a unique opportunity to move towards the way of a concrete sustainable mountain development, which – according to the document *International Year of Mountains: Concept Paper* – "*includes a wide range of topics, calling for interdisciplinary, integrated approaches*" (FAO, 2000).

A key event during IYM was the second World Summit on Sustainable Development (WSSD), held in Johannesburg in September 2002. While principles of Agenda 21 were reaffirmed at the second Earth Summit, the specific actions to be taken for the preservation and sustainable development of mountain regions were laid out in section IV, paragraph 42, of the *Johannesburg Plan of Implementation*, where the role of mountain ecosystems in "*supporting particular livelihoods and including significant watershed resources, biological diversity and unique flora and fauna*" was reaffirmed, along with their fragility and vulnerability and the consequent strong protection needs (UN, 2002).

Yet, the actions identified as priorities by the *Johannesburg Plan of Implementation* seem to be too generic and – to some extent – obvious, failing to bring an original contribution to the debate on mountain issue as well as to push governments to commit themselves in enhancing their efforts towards sustainable mountain development.

Nevertheless, the ascription of a whole paragraph to mountain issue can be seen even a conquest, since mountains had not deserved any mention at all in some important preliminary documents such as the Communication from the Commission to the Council and European Parliament *Ten years after Rio: Preparing for the World Summit on Sustainable Development in 2002*, submitted in February 2001.

2.2.5 – The main institutions dealing with mountains and the state-of-the-art

Presently, a number of institutions and organisations deal with mountain issues, beyond those already mentioned in this chapter, such as:

[1] The year 2002 was also declared as the International Year of Ecotourism: this coincidence, far for being fortuitous, meant that ecotourism represents a valuable opportunity for an integrated sustainable development of mountain areas, being one of the most promising and rapidly growing economic sectors within the tourism industry.

- the *Centro di Ecologia Alpina* in Trento, the *Istituto Nazionale della Montagna* and the *Osservatorio per la Montagna* in Rome, Italy[1];
- the *Centre for Mountain Studies* at Perth College, Scotland;
- the *Institut de la Montagne* in Chambéry, France;
- the *Strategic Planning Centre* in the Pindos Mountains, Greece;
- the *Federal Institute for Mountainous and Less-favoured Areas* (BABF) in Vienna, Austria;
- the *International Mountain Society* in Bern, Switzerland;
- the *International Scientific Committee on Research in the Alps* (ISCAR);
- the *World Mountain People Association* (WMPA), founded at the first World Mountain Forum in 2000;
- the *European Observatory on Mountain Forests* and the International Union of Forest Research Organizations' (IUFRO) *Task Force on Forests and Mountain Development*;
- the *International Partnership for Sustainable Development in Mountain Regions*, or '*Mountain Partnership'*, a voluntary alliance of partners launched at the WSSD in 2002 and dedicated to improving the lives of mountain people and protecting mountain environments around the world (Price, 2004);
- the *Mountain Research Initiative* (MRI), funded by the Swiss federal government and focusing on climate change and its impacts in the world's mountainous regions;
- the inter-commissional *Mountains Initiative Task Force* (MIT) established by the IUCN's Commission on Ecosystem Management and the IUCN World Commission on Protected Areas early in 2003.

To date, the majority of documents and international studies on mountain-related issues largely refer to those problems which are typical of mountain regions in developing countries, namely over-exploitation in terms of deforestation, mining and grazing, while the threats faced by mountains in industrialised countries, such as marginalisation and land abandonment, are less recognized.

Similarly, public opinion in the latter countries is maybe more aware and concerned about global trends such as deforestation, which are taking place mainly in developing countries, than the processes affecting mountains in its own regions. For example, the primary problem in the Alps, as usually perceived in the public mind, is overuse of the land and natural resources caused by mass tourism and transit traffic.

[1] The *Istituto Nazionale della Montagna* was established by Act 284 of 2002. It replaced the *Istituto nazionale per la ricerca scientifica e tecnologica sulla montagna*, established by Act 266 of 1997. The *Osservatorio per la Montagna* was established in 2000.

Yet, although these problems are certainly real, they affect only some limited regions within the Alps, while much more widespread phenomena, such as depopulation, abandonment and forest expansion, are usually overlooked (Stone, 1992).

Furthermore, even though we might argue that global awareness and knowledge on mountain issues is nowadays much more advanced than a few years ago, when mountains played but little part in global discussion on environment and development (Price and Messerli, 2002), we might notice that most of the regional and global initiatives so far implemented in favour of mountain areas have been generated and developed within a sectorial context, mostly focusing on strictly mountain - related issues.

On the contrary, problems presently affecting mountain regions mainly take origins from exogenous factors. Thus, viable solutions should be explored in a wider context, trying to integrate mountain policies into sustainable development policies as a whole.

2.3 – Mountain legislation: main international, European, regional and national documents on mountain areas

Several binding and not-binding international documents and agreements refer to mountain regions, either directly or indirectly. Below a brief overview of mountain legislation is provided, from global laws to national level.

2.3.1 – The international law on mountains

According to Villeneuve *et al.*, we might distinguish between treaty and soft laws dealing with mountain issues. As far as the treaty law is concerned, to date there are no examples of binding global conventions specifically dealing with mountains (Villeneuve *et al.*, 2002). On the other hand, there are several agreements which, although not focusing on mountains as such, do contain some references to mountain people and resources, covering some specific aspects of sustainable mountain development (*ib*.).

Among these, the most important are the *Convention on Biological Diversity*, aiming at the "*conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources*" (UNCED,

1992b), and the *Convention on Climate Change*, whose preamble specifically mentions the vulnerability of fragile mountain ecosystems to climate change (UN, 1992).

More generally, the principle of sustainability, sanctioned through several international agreements, implies a wise and equitable use of mountain resources in environmental, economic, social and cultural terms, taking due account of the interests of both present and future generations (Fodella and Pineschi, 2000).

Conversely, there are numerous soft-law instruments, such as declarations, resolutions and plans of action, specifically concerning mountain issues. Beyond the already mentioned Agenda 21, perhaps the most renowned is the *Charter for World Mountain People*, also known as the *Quito Declaration*, promoted by the *World Mountain People Association*, broadly discussed during several consultations and finally adopted on 4 September 2003.

The Charter states some general principles and rights of mountain people, underlying the intrinsic peculiarity of mountain environments[1]. It is also observed that mountain territories, "*held in disdain for a long time*", are now increasingly considered, either as areas for recreation or as a natural environment dedicated to conservation. Yet, according to the signatories mountains should not be reduced to these two dimensions. Even though these functions are assumed as necessary, the Charter invites not to identify mountain people with them, but to "*construct a society founded on the diversity of trades, and social and human components, as a factor of economic solidarity and social enrichment*" (World Mountain People Association, 2003).

Another significant document is the *Cusco Declaration on Sustainable Development of Mountain Ecosystems*, which lists the environmental, social and economic measures most widely recognized as crucial to sustainable mountain development (International Workshop on Sustainable Mountain Development, 2001). The Declaration was drawn up by representatives of 18 countries gathered in Cusco (Peru) in 2001.

Among the other non-binding instruments, Euromontana declarations are of particular relevance for our purposes, since they mainly refer to European mountains related issues. Euromontana, an association of 53 mountain organisations from 18 European countries, has adopted several declarations at its periodic conventions[2]. Among the others, the *Final declaration*

[1] "*Mountain areas are different. Society must not exclude their people nor marginalize their territory. Nor must it try to standardize or assimilate, ignoring the specificities and particularities of these regions*" (World Mountain People Association, 2003).

[2] Euromontana has its origins in a FAO sponsored seminar on mountain agriculture in 1953. In 1974, the Confederation of European Agriculture (CEA) set up a permanent working group for "socio-economic issues in mountain regions". Called *Euromontana*, the group comprised agricultural representatives from the countries of the

of the Krakow Conference, held in 1995, mentions over-development on the one hand and abandonment of human activities on the other hand as threats being able to upset the equilibrium of European mountains' natural environment (Euromontana, 1995).

The *Final Declaration for the Second European Mountain Conference*, held in Trento on 17 and 18 March 2000, explicitly criticises European community institutions for "*continuing to move away from a mountain policy*". The Declaration also recognizes globalisation trends, open markets and the race for competitiveness as major threats for diverse sectors of activity in mountain areas, while identifying diversification and the development of products and services of high added value and high quality as the main solutions to implement. Along with these strategies, also compensatory payments for handicaps are recognized as indispensable for mountain farming (Euromontana, 2000).

Euromontana declarations always refer to the cultural character of European mountains and their importance as natural and cultural heritage (Euromontana, 1995; 2000).

2.3.2 – The *European Charter of Mountain Regions* and the *European Landscape Convention* (Council of Europe)

The *European Charter of Mountain Regions* is promoted by the Congress of Local and Regional Authorities of the Council of Europe[1] and it represents one of the most significant and committed efforts to urge European countries to pay particular attention to the specific problems of mountains by adopting a number of shared principles to be included in a common document on mountain regions.

The most recent version of the draft charter contains some interesting indications on mountain farming and land abandonment, such as the urgency of combating the exodus of young people from the uplands and the need of "*preserving farmland and pastureland and maintaining and modernising agricultural activities by an approach specific to mountain agriculture*" (CLRAE, 2003). Moreover, the documents invites member countries to "*remunerate the ecological services performed by mountain populations, particularly as regards the maintenance of the landscape and protection against natural risks*" (*ib.*).

Alps and Pyrenees. In 1994, Euromontana decided to open to Central and Eastern European countries and to include representatives of sectors other than agriculture, such as rural development and the environment. In 1995 it was agreed to establish Euromontana as an independent legal entity, which was officially founded in Rome on 4 March 1996 (Euromontana, 2005).

[1] The Congress of Local and Regional Authorities of the Council of Europe was established in 1994 as a consultative body to replace the former Standing Conference of Local and Regional Authorities of Europe. It is the voice of Europe's regions and municipalities in the Council of Europe.

Unfortunately, an invitation to the Contracting Parties to "*control natural afforestation on disused agricultural and pasture land in order to avoid closing tracts of countryside and spoiling their natural beauty*" disappears in the last draft Charter, while being present in one of the previous versions (CLRAE, 1995).

Let us go briefly through the main steps of the troubled *iter* of the *European Charter of Mountain Regions*.

The need for a European charter of mountain regions, as an instrument defining the principles that should govern the planning, development and protection of mountain regions, was firstly addressed by the second *European conference of mountain regions*, held in Trento in 1988. However, the document was not approved by the participants (more than 200 administrators representing the member states of the Council of Europe), while it was approved only in 1994, at the third conference, held in Chamonix on 15 to 17 September 1994 (Committee of Regions (CoR), 2003).

Consequently, the Congress of Local and Regional Authorities of Europe (CLRAE) adopted Recommendation 14 (1995) "on the European charter of mountain regions" in 1995. This recommendation included a first draft legal instrument entitled "draft European Charter of Mountain Regions" and was approved by the CLRAE and transmitted to the Committee of Ministers. Also the Parliamentary Assembly of the Council of Europe adopted Recommendation 1274 (1995) in favour of the draft Charter, requesting the Committee of Ministers to make the Charter a contractual instrument to be submitted to member countries for adoption.

Finally, the Committee of Regions delivered an opinion "on the European charter on Mountain areas", approving "*the analysis, guidelines and policies proposed by the draft charter*" and at the same time calling "*for the European Union to define a mountain policy based in the recommendations of the draft Charter*" (Committee of Regions, 1995).

A few years later, the Parliamentary Assembly reaffirmed its support to the draft European charter of mountain regions in its Recommendation 1433 (1999), paragraph 18.d, stating: "*the Assembly recommends that the Committee of Ministers […] respond to the expectations of many Council of Europe member states and pay particular attention to the specific problems of mountain regions by adopting the draft convention on mountain regions and opening it for signature*" (Parliamentary Assembly of the Council of Europe, 1999).

Unfortunately, the first version of the draft Charter was considered too binding on governments, and was not approved by the Committee of Ministers, which decided not to open

the document for signature and ratification by member states. Following this decision, the Directorate of Legal Affairs of the Council of Europe Secretariat proposed amending the draft European Charter of Mountain Regions to turn it into a draft outline convention.

Following this suggestion, the CLRAE adopted Recommendation 75 (2000) "on the draft European outline convention on mountain regions" in 2000. Once again, the CLRAE was fully supported by the Parliamentary Assembly (which did not adopt any resolution at that time). The recommendation included a "draft European outline convention on mountain regions" (CLRAE, 2000).

Yet, the Committee of Ministers replied to the recommendation of the CLRAE by means of a decision adopted during the 745th meeting, on 14 March 2001. The reply states that, although "*the committee of ministers has carefully considered Recommendation 75 (2000) on the draft European outline convention on mountain regions adopted by the Congress […] and has forwarded […] Recommendation 75 to the European Ministers responsible for Regional Planning (CEMAT)*", the CEMAT "*did not follow up the proposal made by the representatives of the CLRAE and the Parliamentary Assembly concerning a draft European outline convention on mountain regions*" (Committee of Ministers, 2001).

Three years later the CLRAE adopted one more Recommendation "on the European Charter for Mountains" (Recommendation 130 (2003)), a document which, according to the Parliamentary Assembly's Recommendation 1638 (2003), paragraph 8, "*has strong political ramifications but is not-binding for Council of Europe member states*" (Parliamentary Assembly, 2003). This recommendation included the text of a draft Recommendation of the Committee of Ministers of the Council of Europe to member States "on the European Charter for Mountains", as well as a proposed text for the European Charter for Mountains.

The participants at the *Conference on the Sustainable Development of Mountain Regions, European Transit Policy and the Challenge of Globalisation*, held in Cavalese (Italy), on 16-17 June 2003 "*regretted that the proposal of a European charter of mountain regions was not taken up*" and fully supported Recommendation 130 (2003) to be submitted to the Committee of Ministers of the Council of Europe for adoption (Committee on the Environment, Agriculture and Local and Regional Affairs of the Parliamentary Assembly of the Council of Europe, 2003b).

During the same year the Committee on the Environment, Agriculture and Local and Regional Affairs of the Parliamentary Assembly of the Council of Europe published a report on "Sustainable development of mountain regions", containing a draft recommendation which was

adopted by the Standing Committee of the Parliamentary Assembly a few weeks later. Recommendation 1638 (2003) invites the Committee of Ministers to respond positively to the initiative of the CLRAE "*by adopting a recommendation to member states on the European charter for mountains, with a view to establishing a common pan-European policy on mountain regions*" (Parliamentary Assembly, 2003).

To date, Recommendation 130 (2003) on the European Charter for Mountains by the Congress of Local and Regional Authorities of Europe has never been approved, nor has the Charter been adopted.

The Council of Europe also promoted the *European Landscape Convention*, a Charter which – although nor directly referring to mountain regions – has some significant implications on mountain landscapes. The *European Landscape Convention* defines the landscape as "*an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*", so that landscape protection implies "*actions to conserve and maintain the significant or characteristic features of a landscape, justified by its heritage value derived from its natural configuration and/or from human activity*" (art. 1). Thus, the importance of maintenance of human activities and particularly of those which shaped the European landscapes the most, i.e. agricultural activities, is once more underlined.

The Convention has been adopted by the Council of Europe's Committee of Ministers on 19 July 2000 and was signed on 20 October 2000 by 18 countries during a Ministerial Conference in Florence. To date, 27 countries signed the Convention and 10 of them ratified it. The Convention entered into force in 2004. Italy is among the signatories countries, but it has not yet ratified it (Ministero per i Beni e le Attività Culturali, 2005).

2.3.3 – The EU legislation on mountains

To date there is no specific mountain legislation within the European Union. Yet, as for the international law, there are several sectorial policies, such as the agricultural and environmental ones, which are related to mountain issues to many respects.

In particular, within the EU legislation mountains have always been dealt with regard to agriculture, primarily focusing on agricultural production (Nordregio, 2004). Since 1975 mountain farming has been one of the sectors specifically addressed by the Common Agricultural Policy (CAP).

The Council Directive 75/268/EEC of 28 April 1975 "on mountain and hill farming and farming in certain less-favoured areas" states that "*the less-favoured farming areas shall include mountain areas, in which farming is necessary to protect the countryside, particularly for reasons of protection against erosion or in order to meet leisure needs"* (art.3).

Even though mountain farming has never been considered among CAP's priorities, yet since then its relative importance continued to raise, and now it occupies a significant position within the broader theme of the so-called Rural Development (see Chapter 7 for further details).

Regarding the environmental policy, the Sixth Environmental Action Programme of the European Community *Environment 2010: Our future, Our choice* – the document setting out the key environmental objectives and targets that the EU should fulfil before expiry of the Programme (European Parliament and the Council, 2002) – stresses in particular mountains' recreational function, referring to the wish of people to be able to enjoy their beauty.

Likewise, in Section 4, "Nature and biodiversity", mountain areas are mentioned with regard to tourism development: they are recognized, together with islands and coastal areas, as "*fragile areas, which provide bio-diversity richness that require particular attention and specific integrated management means when dealing with tourism development*". Once again, mountains are considered only as regards their role as tourist destinations, without acknowledging them as living environments hosting human communities, thus failing to meet the appeal of the *Charter for World Mountain People* (see Paragraph 2.3.1).

On the other hand, the environment action programme recognizes the role of extensive agricultural practices for biodiversity conservation. Of fundamental importance is the following statement: "*preserving nature and biodiversity does not necessarily mean the absence of human activities. Much of today's valuable landscape and semi-natural habitats are a result of our farming heritage. However, the ecological stability of such modern landscapes with diverse species of flora and fauna are also threatened as land is abandoned or marginalised. Maintaining valuable landscapes such as these requires appropriate land management activities*".

Abandonment of land is also considered as a predisposing factor for soil erosion (CEC, 2001b). To this end, the Programme specifically mentions the "*development, within the CAP, notably of agri-environment measures since 1992 and of rural development plans with a strong environmental content*" among the existing policies and instruments to enhance in order to achieve an effective protection of nature and biodiversity within the European Union (*ib.*).

More specifically, the Council Directive 92/43/EEC "on the conservation of natural habitats and of wild fauna and flora" (the so-called *"Habitats Directive"*) is very important for mountain ecosystems. One of the seven European bio-geographical regions identified by the Directive is the Alpine region, including many European mountain chains such as the Alps, the Apennines, the Pyrenees and the Fennoscandian uplands.

Within this bio-geographical region a list of 959 Sites of Community Importance (SCI)[1] has been approved by the European Commission in 2003. Indeed 99 habitats, 97 animal and 63 plant species of those specifically mentioned by the Directive as "of community interest" can be found in the Alpine bio-geographical region (Annex I and II). In particular, among the habitats to be protected according to the Directive are natural and semi-natural grassland formations: since natural habitats are defined as "*terrestrial or aquatic areas distinguished by geographic, abiotic and biotic features, whether entirely natural or semi-natural*" (CEC, 1992), "natural" habitats somehow include also "semi-natural" areas, created and maintained by human activities, such as pastures, traditionally farmed lands and cultivated woods.

More generally, in the draft European Constitution, as agreed on 18 June 2004 by European Heads of State and Governments, mountains deserve just a trivial, marginal mention: "*in order to promote its overall harmonious development, the Union shall develop and pursue its action leading to the strengthening of its economic, social and territorial cohesion. In particular, the Union shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions. Among the regions concerned, particular attention shall be paid to rural areas, areas affected by industrial transition, and areas which suffer from severe and permanent natural or demographic handicaps such as the northernmost regions with very low population density, and island, cross-border and mountain areas*".

On the contrary, the *European Spatial Development Perspectives* (ESDP), as agreed at the Informal Council of Ministers responsible for Spatial Planning in Potsdam in May 1999, contain several mentions to mountain regions, although they are not gathered in one chapter but they are spread throughout the document. Most of the times mountains are cited together with islands and coastal areas, with particular regard to their biological richness and environmental sensitiveness, endangered by growing mass tourism.

[1] A *Site of Community Importance* (SCI), *sensu* Directive 92/43/EEC, means a site which contributes significantly to the maintenance or restoration of a particularly valuable natural habitat type or species as specified in the Annexes of the Directive itself (CEC, 1992).

Along with uncontrolled tourism development, also erosion and non-cultivation are identified as major threats to mountain ranges, which are mentioned among the main types of endangered areas with regard to their wide diversity of natural and cultural heritage. Particular significant is the reference to spontaneous afforestation, recognized as one of the main processes affecting EU's biodiversity by contributing to loss of habitats and decreasing species numbers through destruction, modification and fragmentation of ecosystems.

The document also contains a more explicit reference to the negative impacts caused by farmland abandonment, while referring to the deterioration of the countryside due to lack of human intervention, occurring where traditional agricultural land use methods are given up. It is acknowledged that "*neglecting land management in endangered areas, such as mountainous areas, can have particularly serious consequences, for example when it reinforces soil erosion*" (EC, 1999).

Unlike the Sixth Environmental Action Programme of the European Community, mountains are referred to also as "*significant economic and living areas*", as well as identity-giving entities. Mountains are also mentioned for being the source of fresh spring water, as well as for providing habitats for wild animals and plants (*ib.*).

Despite the numerous sectorial policies somehow addressing mountain issues, current EU policies often exhibit inconsistency with respect to mountain areas and do not take their special needs adequately into account. To date a coordination between measures at different levels relating to various sectors as well as a coherent and effective strategy aimed at promoting sustainable mountain development at EU level are still lacking (EEA, 1999a).

In order to fully exploit the potential of mountain areas, improvements are needed in the framework of existing EU policies (Committee on Agriculture and Rural Development, 1998). Although the European Union has been repeatedly been called upon to give attention to mountain areas by adopting a regulation containing specific measures or policies, it seems clear that the Community cannot adopt any specific initiative without the support of a specific Treaty provision enshrining its competence in this field (CoR, 2003).

In particular, according to the Committee of Regions' *Report on Community action for mountain areas*, mountain regions should be explicitly mentioned at the end of Article 158 of Title XVII (Economic and Social Cohesion) of the Treaty establishing the European Union, along with other "*less-favoured regions, including rural areas*" (European Communities, 1957). The Report also states that the Union "*must recognize the special nature of mountain areas and the ensuing need for a specific institutional policy on the matter*", since "*there is a particularly*

pressing need for policies to safeguard and promote the environment, landscape and biodiversity, the traditional farming practices of the people who settled here from distant lands centuries ago and who have tended the countryside ever since" (CoR, 2003).

For all these reasons, mountain areas represent a key challenge for the Union (*ib.*). According to a report published by the European Parliament Committee on Agriculture and Rural Development in 1998, "*the main objectives of a Community strategy for mountain regions should be to ensure fair compensation for the environmental benefits they provide to society and develop not so much a permanent aid system as the ability of the population and communities in these regions to practise sustainable development themselves, concentrating on their potential rather than their handicaps, at a time when cohesion and competitiveness at European level are increasing*".

Unfortunately, in the majority of the official documents related to mountains these are mainly referred to as disadvantaged areas suffering from remoteness, handicaps and depopulation, while their potentialities are hardly highlighted. In order to promote an effective strategy for sustainable mountain development, a more positive and proactive vision is needed.

2.3.4 – The Alpine Convention

The *Convention on the Protection of the Alps*, or *Alpine Convention,* is an international treaty signed in 1991 by the Alpine countries Austria, France, Germany, Italy, Liechtenstein and Switzerland as well as by the European Union, with the aim of achieving a comprehensive policy on the protection and sustainable development of the Alps. In ratifying it, the Contracting Parties commit themselves to jointly achieving this goal (European Communities, 1991). The convention is the only binding instrument in existence that specifically deals with a mountain range (Villeneuve *et al*., 2002).

In 1989 the participants at the first Alpine Conference held from 9 to 11 October in Berchtesgaden (Germany) had agreed to draw up a convention binding under international law for the protection of the Alps. Two years later, the Convention was signed on the occasion of the 2nd Alpine Conference held on 7 November 1991 in Salzburg (Austria). Slovenia and Monaco joined the Convention in 1993 and 1994 respectively. The Alpine Convention formally entered into force on 6 March 1995. All nine parties had ratified the Convention by 1999.

The Convention is designed as a framework agreement, setting out its substantive provisions in general terms. The Convention is thus supplemented by nine implementation protocols, titled as follows:

- *Regional planning and sustainable development;*
- *Conservation of nature and the landscape;*
- *Mountain farming;*
- *Mountain forests;*
- *Tourism;*
- *Soil conservation;*
- *Energy;*
- *Transport;*
- *Settlement of disputes.*

An additional protocol allowed Monaco to become a party to the Convention. The protocols are independent implementation agreements under international law and have to be ratified individually. For the Contracting Parties that have expressed their consent to be bound by a protocol, this enters into force three months after the date on which three countries have deposited their instruments of ratification, acceptance or approval (art. 11).

While all of the countries have already *signed* all the protocols (with the only exception of Monaco not having signed the protocol for Energy)[1], so far only five of the Alpine countries have *ratified* all existing protocols. Liechtenstein, Austria and Germany ratified all of them in 2002, so that for the first three Contracting Parties the protocols entered into force by the end of the year. Slovenia ratified all protocols in January 2004.

In the meantime, the protocols Mountain farming and Settlement of disputes had been ratified by France in 2003 and the protocols Regional planning and sustainable development, Tourism, Soil conservation and Settlement of disputes had entered into force in Monaco. France ratified the remaining protocols in May 2005, while Monaco ratified the protocol Conservation of nature and the landscape in 2004. To date, all of the protocols are in force in five countries, namely: Austria, Germany, France, Liechtenstein and Slovenia. Monaco has ratified most of them, while Switzerland and Italy did not ratify any protocol. The state of the art of the ratification of the protocols is synthesised by Table 2.2.

Further measures in the sectors of population and culture, prevention of air pollution, water and waste management are planned within the framework of the Alpine Convention.

Since 2003 the *Permanent Secretariat of the Alpine Convention* has been based in Innsbruck (Austria), with a branch in Bozen (Italy).

[1] As far as the European Union is concerned, so far it has signed only three protocols (Regional planning, Mountain farming, Conservation of nature and the landscape).

	RATIFIED	IN FORCE
Regional planning and sustainable development	A, D, F, FL, MC, SLO	A, D, FL, MC, SLO
Conservation of nature and the landscape	A, D, F, FL, MC, SLO	A, D, FL, MC, SLO
Mountain farming	A, D, F, FL, SLO	A, D, F, FL, SLO
Mountain forests	A, D, F, FL, SLO	A, D, FL, MC, SLO
Tourism	A, D, F, FL, MC, SLO	A, D, FL, MC, SLO
Soil conservation	A, D, F, FL, MC, SLO	A, D, FL, MC, SLO
Energy	A, D, F, FL, SLO	A, D, FL, MC, SLO
Transport	A, D, F, FL, SLO	A, D, FL, MC, SLO
Settlement of disputes	A, D, F, FL, MC, SLO	A, D, F, FL, MC, SLO

Table 2.2 – Protocols of Alpine Convention : state of the art. Source: CIPRA international, 2005

2.3.5 – Mountains in the Italian legislation

Italy, together with France and Switzerland, has been one of the first countries to set up a formal integrated mountain policy. To start with, the Italian Constitution, promulgated in 1948, states a general principle of special policy for mountain areas, that must be given specific statutory advantages (art. 44)[1]. As early as 1952 a law "in favour of mountain territories" was passed (Act 991 of 1952). This law was mainly targeted to improve economic living conditions of mountain populations by enhancing crafting activities (art. 2) and modernising agriculture (art. 3). In line with the European policy prevailing at that time, great relevance was given to expand forest areas by planting trees (spruce – *Picea abies* – was the most largely utilised species), mainly for productive purposes.

Interesting was also the institution of the so-called "*consorzi di bonifica montana*", comprising territories which were no economically viable because of an improper management or their bad physical conditions. These territories were re-arranged by private or public partnerships in order to improve their productivity and/or efficiency in providing environmental services of public utility (e.g. defence against natural hazards) (artt. 18-30).

In 1971 "Mountain Communities" were established as groups of municipalities or parts of municipalities acting as specific tools used to implement mountain policy, ex Act 1102 of 1971, enacting "new provisions for mountain development"[2]. The text of the law contains several

[1] Art. 44 of the Italian Constitution literally states as follows: "*La legge dispone provvedimenti a favore delle zone montane*".
[2] Act 1102 of 1971, art.1: "*Le disposizioni della presente legge sono rivolte a promuovere […] la valorizzazione delle zone montane favorendo la partecipazione delle popolazioni, attraverso le Comunità montane, alla predisposizione e*

interesting topics, such as the involvement of local communities, the need to restrain socio-economic disparities between lowland and upland inhabitants, the idea of an integrated mountain economy and the strengthening of mountain populations' capacity building (art.2).

Numerous and important tasks were delegated to Mountain Communities, which were given much power. Mountain Communities are considered as an autonomous local authority in political and administrative terms (Villeneuve *et al*., 2002). For example, each Mountain Community has the duty of drawing up and implementing a Socio-economic development plan, concerning its own territory (art. 5)[1]. Among its rights, the possibility to purchase, rent or even expropriate land which is no longer utilised by the legitimate owners, particularly where necessary for specific purposes such as nature conservation or slope stability (art. 9).

A mountain law was then approved in 1994 (Act 97 of 1994), which reaffirms, along with art. 44 of the Italian Constitution, that "safeguard and valorisation of mountain regions are of prominent national interest" (art.1). Once again, stress is placed on improving the living conditions of mountain populations, particularly by promoting public services and infrastructure facilities (Villeneuve *et al*., 2002).

The mountain law also establishes the Mountain Information System (*Sistema Informativo per la Montagna*) as well as the National Mountain Fund (*Fondo Nazionale per la Montagna*), whose resources are supposed to be utilised in favour of the development of agro-pastoral and forestry activities, environmental protection, initiatives against depopulation of upland areas and improvement of services and facilities in mountain areas (art. 2).

Yet, the law is weak in many respects. For example, several public services have to be managed at communal level, while mountain municipalities are often too weak to run or even start them up properly; moreover, a common strategy aiming at counteracting depopulation and exodus from upland is lacking (art. 11).

Secondly, the law still largely refers to plantations and planned afforestation, not taking into account the already evident trend towards an increase in forest area due to land abandonment and spontaneous afforestation, nor the criticisms rose from many parts about the once common practice of establishing forest plantations (art. 9).

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all'attuazione dei programmi di sviluppo e dei piani territoriali dei rispettivi comprensori montani ai fini di una politica generale di riequilibrio economico e sociale nel quadro delle indicazioni del programma economico nazionale e dei programmi regionali".

[1] Both Act 991 of 1952 and Act 1102 of 1971 were modified by Act 142 of 1990 on the "*Ordinamento delle autonomie locali*". Articles 28 and 29 introduce some minor changes with regard to Mountain Communities' role and activities. Act 142 of 1990 was then repealed by the "*Testo Unico sugli Enti Locali*" (Dlgs 267/2000).

Finally, the law enhances the rights of co-heirs who are tenants and managers of the farmland at the same time, by giving them the right of purchasing the whole property once the contract has expired; yet, such an appreciable initiative aiming at conserving properties' integrity is weakened by the numerous and severe restrictions imposed to the heirs potentially interested in acquiring and running the land (art.4).

On the other hand, the law allows Mountain Communities to contribute up to 75% to the implementation of "small works" (not further specified) and environmental protection activities to be realised on farmland by private owners (art. 7).

Finally, the law calls for new norms pushing administrators at all levels to decentralise in mountain territories those activities which "*do not necessarily need to be located in urban areas*", such as research centres, universities, museums, cultural, sporting and recreational facilities, highly specialised hospitals and so on (art. 14). Although the scenery depicted is certainly extremely desirable, it is impossible not to think about the difficulties of locating such important institutions and facilities in remote or otherwise not easily accessible areas, far away from the urban centres where most of their current or potential employees presumably live[1]. Since it is likely that such infrastructures will be located in proximity of the main settlements in the valley floors, this initiative risks to further enhance the already well established trend of polarisation and urbanisation around the main mountain centres, causing negative environmental impacts in terms of air pollution and land consumption.

A bill containing "provisions for the valorisation and conservation of mountain territories" has been submitted in July 2004 and is currently being discussed within the Italian Parliament (DDL3036 Senato). According to the bill, special priority is to be given to the so-called "*comuni ad alta specificità montana*", i.e. those less-favoured municipalities which at the same time are characterised by promising development opportunities. The main criteria for the identification of the "*comuni ad alta specificità montana*" are: territorial extension, population and depopulation index, terrain slope, altitude, remoteness and tourism development (art. 2).

Once again, the legal instruments seem to fail their objectives. For example, the bill attempts to encourage young people to undertake farming activities, but the measures proposed are quite inadequate (see art. 11). Moreover, the bill seems to promote an out-of-date model of mountain development, by supporting downhill skiing facilities as well as reforestation plans (articles 23 and 8).

[1] Yet, a successful example is given by the Centre for Alpine Ecology (*Centro di Ecologia Alpina* – CEA), a research body of the Trento Independent Provincial Council situated in Viote di Monte Bondone, at an altitude of 1500 m in an area of great historical and environmental interest, approximately 25 km from Trento (Italy). The structure includes laboratories, conference halls, a library and several rooms (CEA, 2005).

The bill was also criticised by the National Union of Mountain Municipalities and Communities (*Unione Nazionale Comuni Comunità Enti Montani* – UNCEM), which defined it as inadequate and contradictory, with regard both to the objectives it sets and the specific sectorial initiatives it foresees; the UNCEM showed concern about the risk that this bill will even lead mountain territories to a state of regression (Bella and Saponaro, 2005).

Significant implications for mountain regions are also contained in the Strategy for Sustainable Development in Italy (*Strategia d'Azione Ambientale per lo Sviluppo Sostenibile in Italia*), promoted by the Italian Minister for Environment in 2002 and setting out an environmental action plan for the Italian territory. Mountain areas are given particular importance with regard to the upper parts of major rivers' water catchments: "*a proper management of the upper basin means better conditions for hydraulic conditions in the lowlands, which – although representing a limited part of the Italian territory – host the majority of people, infrastructures and public and private heritage*" (Ministero dell'Ambiente e della Tutela del Territorio, 2002).

On the one hand, the Strategy recognizes the prominent cultural character of mountain landscapes and the connection between these semi-natural habitats and the high level of biodiversity they host. Consequently, the abandonment of farming practices in marginal land and more generally the decrease of the Utilised Agricultural Area are identified as threats to biodiversity conservation, particularly in the mountains.

On the other hand, spontaneous afforestation and re-naturalisation of wooden areas – which are among the most harmful consequences of farmland abandonment – are unaccountably seen as potential instruments of "*restoring the original functions of natural and agrarian systems*" in the mountains as well as in the hills and lowlands (*ib.*). Yet, while there are evidences of the positive effects determined by such processes particularly in the rural and semi-urban lowlands, the majority of the research studies agree on the negative impacts caused by forest expansion in the mountains (see Chapter 6).

According to the results of a European research project, titled *Mountain Areas in Europe: Analysis of mountain areas in EU member states, acceding and other European countries*, Italy is one of the very few countries holding a specific legislation for mountains and a well-developed policy toward mountain areas (Nordregio, 2004).

Indeed, Italy is quite exceptional in having adopted a specific mountain legislation, which is one of the oldest of its kind; moreover, Mountain Communities potentially represent a pivotal institution for governing mountain territories at local level, and they have been proposes as a

model for local governance as well (Committee on the Environment, Agriculture and Local and Regional Affairs of the Parliamentary Assembly of the Council of Europe, 2003a).

Yet, the existence of a specific mountain legislation seems not to be a sufficient, nor even necessary, tool for implementing sustainable mountain development: as we will see throughout Section II, and particularly in Chapter 5, the state of Italian mountain territories is not as good as that of other Alpine countries, where mountain problems are addressed by effective sectorial policies, rather than being homogeneously treated by mountain a-specific laws.

SECTION II

MARGINALISATION, LAND ABANDONMENT AND FOREST EXPANSION IN MOUNTAIN AREAS: D.P.S.I.R. ANALYSIS

CHAPTER 3 – DRIVING FORCES

As mentioned in the introduction, this section – from Chapter 3 to Chapter 7 – is based on the first ever attempt to apply the DPSIR framework to the processes of land abandonment and the consequent forest expansion, which together represent the focus of the research.

To start with, Chapter 3 describes the main driving forces leading to the phenomenon of land abandonment, which might all be traced back to the broad process of marginalisation, which in turn can be distinguished into two different processes, namely geographical and sectorial marginalisation. Marginalisation processes are actually the primary cause of all the topics considered within the research, such as depopulation, land abandonment, forest expansion and so on, thus representing one of the main focuses of the thesis.

3.1 – Marginalisation: an overview

Major driving forces of change affecting mountainous areas across Europe include economic instruments, demographic change, shifts in land-use, policy measures, new technologies, pollution and climate change. Many of these forces originate in lowland areas. These are of concern not only to the mountain societies and environments affected, but also to Europe as a whole (European Intergovernmental Consultation on Sustainable Mountain Development, 1996).

With particular regard to land abandonment in mountain areas, the numerous socio-economic and environmental driving forces leading to such a phenomenon might be all traced back to the broad process of marginalisation. The driving forces behind marginalisation and abandonment of rural areas are rather complex and normally they cannot be identified unambiguously.

A combination of factors is often at the origin of the marginalisation process, such as:

- unfavourable climatic and environmental conditions;
- remoteness from main centres and markets;
- poor transportation conditions;
- shortage of adequate infrastructures;
- uncompetitive forms of agriculture involving low productivity and income levels;
- demographic changes such as depopulation and ageing.

Marginalisation is a term which is hardly used without any attribute. Several kinds of marginalities can be identified (Pettenella, 1984):

- *Physical or environmental marginality*, where natural factors such as climatic, geopedologic, topographic and morphological conditions contribute to determine strict limitations in utilising an area for certain economic activities, which are not economically viable under these circumstances. For this reason, a physical marginality with regard to specific productive purposes and an intrinsic physical marginality might be distinguished. An example of the former kind is given by grassland located at high altitude, which can be utilised as pasture but not as arable land, due to the short growing season. On the other hand, a slope prone to landslides is affected by the latter kind of marginality, since it cannot be utilised for any kind of activities.
- *Social marginality*, depending on the demographic characteristics of the community (e.g. ageing population and exodus of young people) and the availability of infrastructures and facilities.
- *Economic marginality*, specifically referring to the characteristics of an enterprise or farm, such as the structural dimension and the management capability.

However, marginalisation is sometimes a subjective concept, depending on the point of view adopted. The correct question to ask is thus not so much *whether* an area is marginal or not, as in *which respect* it is considered to be marginal. In other words, if "marginal" is to be meant in contrast with "central", it is important to understand what is in the centre and why. We can perceive different approaches to defining the circumstances in which an area is to be considered as marginal. The conditions an area has to meet to be considered either central or marginal are not given, but they need to be defined in respect with a particular function or vision; the state of being marginal is thus not unalterable nor unavoidable, but it changes according to the criteria selected and the prevalent opinion.

For example, beyond the main causes of marginalisation mentioned above, one particular factor is represented by the low level of interest commonly aroused by mountain problems and in particular the scarce political attention towards certain mountain territories, which thus become marginal – or they are enhanced in their marginality – mainly because of a lack of interest, rather than for endogenous factors or because of the prominent economic trends.

One of the major threats to most mountain areas is thus the very own nature of the dominant development paradigm, which tends to marginalize the less favoured territories, and leads the States to invest in those areas which seem more capable to reproduce the capital (i.e. more competitive) and which have more power in terms of population pressure (Cristóvão, 2002).

Among the main reasons for such a neglect might be the absence of stakeholders being interested in these regions, since more and more mountain inhabitants leave their birth territories, while Non-Governmental Organisations rarely focus on these areas, whose marginality is gradually being accepted by the whole community. Other reasons may be sparse population, limited economic flows, underestimated natural values, confounding complexity and transnational situations, which make mountain areas regarded politically as marginal (EEA, 1999a).

However, marginalisation is a *process*, in the sense that it affects areas, which did not use to be marginal in the past. Marginalisation actually means "becoming marginal", rather than "being marginal". Far from representing just a linguistic detail, such issue is of fundamental importance when analysing the phenomenon of land abandonment and its economic and environmental consequences (see Paragraph 6.3 and 8.2).

3.2 – Geographical marginalisation *versus* sectorial marginalisation[1]

Two different processes of marginalisation can be distinguished, which are particularly important from the point of view of land abandonment: ***geographical*** marginalisation and ***sectorial*** marginalisation. The main factors at the origins of geographical marginalisation are spatial isolation and physical remoteness, which gradually lead to geographical segregation of a certain area. A whole territory suffers from marginalisation, which affects all of the economic sectors taking place within that area. On the other hand, sectorial marginalisation means that a certain economic sector is no longer viable, while other lines of business become significantly more profitable. While the former process leads to the marginalisation of a whole area, the latter one affects only one or a few economic sectors, typically agriculture.

Both these processes are widespread in the Alps and, although different, potentially lead to the same outcome, i.e. land abandonment. Depopulation and over ageing are very common outputs of

[1] Although based on some existing literature (Pettenella, 1984 in particular), the definition of the two kinds of marginalisation processes, with particular regard to their connection with the issue of land abandonment, have been worked out by the author.

geographical marginalisation: the running down of every activity gradually leads to the total abandonment of both land and settlements, which may only occasionally be reutilised as second homes.

Different is the case of sectorial marginalisation, and especially agricultural marginalisation, i.e. a process of sectorial marginalisation where agriculture is the economic sector which is affected the most. This process often takes place in areas which are well developed from a socio-economic perspective. Yet, their prosperity is based on other economic sectors than agriculture, such as secondary or tertiary sectors.

For example, in the Province of Belluno (Italy) these two sectors are typically represented by eyewear industry and winter tourism. In this area the economic development, together with the lack of proper policies, led to the total abandonment of farming activities, so that meadows and pastures are nowadays quite an unusual feature in the landscape, conversely to what happens in the bordering area named Trentino Alto-Adige – an autonomous province holding a high level of independence from the central government – where the maintenance of mountain farming and cultural landscapes has been always given high priority.

Such an irreversible loss of social, cultural and natural heritage is particularly significant nowadays, as since a few years the eyewear district has been slowly but continuously running down: the long-term erosion of natural and cultural resources which has taken place during the last decades is now posing a serious threat to the future sustainability of the whole area.

Indeed, many of the mountain regions where investments have been concentrated on one or just a few economic sectors, such as winter tourism or specific industrial products, are currently suffering from or simply threatened by several driving forces, such as:

- global climate change and the consequent rising temperatures, shifting snowfalls to rainfalls, which is likely to affect skiing resorts located at lower altitudes;
- seasonality and temporary fashions;
- industrial relocation in developing countries, particularly threatening the Small and Medium Enterprises (SMEs) located in marginal areas where road and/or railways networks do not guarantee efficient and rapid transport connections.

It is mainly because of such global trends that these areas are now prone to be marginalized.

3.2.1 – Geographical marginalisation

Geographical marginalisation consists of processes of socio-economic and cultural decline such as closing down of farm enterprises, unemployment, out-migration, over aging, brain drain, rural poverty and social exclusion, loss of infrastructure and services and environmental degradation.

Beyond the strictly economic aspects, also social factors play a crucial role: spatial isolation and geographical remoteness from what is commonly meant by cultural and social life may lead to a feeling of loneliness, which is nowadays unacceptable for most of people and especially for young generations, due to radical changes in social expectations.

Push factors such as lack of employment opportunities do not always represent the first cause for moving of the youngest sectors of rural isolated communities, while *pull factors* like availability of a number of facilities and services, better educational chances and vicinity to main settlements often represent attractions determining the exodus of the most active people from uplands to valley floors. The lack of social, cultural and recreational facilities is indeed an important factor in the abandonment of mountain areas, particularly by young people (Baldock *et al.*, 1996).

As a consequence, marginalisation of most peripheral areas comes together with a process of starting up or development of medium or large settlements, especially located in the valley floors, where social, health and educational services, infrastructures and economic activities are mostly concentrated. Therefore, a *polarisation* process between the most prosperous areas (i.e. the Alpine cities and towns mainly located along the edges or in the valley floors) and the peripheral areas has taken place during the last 30 years[1] (Favry, 2004).

A number of key challenges for people living in mountain areas relate to their comparative disadvantage with regard to many kinds of facilities and services. *Accessibility* and *peripherality* indicators are often used to identify regions whose geographical position is remote and whose transport infrastructure needs to be improved. A peripherality indicator can be interpreted as an inverse function of accessibility, which means that the higher the accessibility, the less peripheral is a region and *vice versa*.

[1] The process of polarisation and development of so-called "local centres" has been evidenced by the results of the research project REGALP – *Regional Development and Cultural Landscape Change*, funded by the European Commission within the 5th Framework Programme and coordinated by the Austrian Regional Consulting *Ziviltechniker Gesellschaft GmbH*.

Lack of easy physical access is often enhanced by the fact that populations are small and spread over relatively large areas. Consequently mountain people often have to travel far from their homes to gain access to a number of services, especially at higher levels (e.g. specialised hospitals and universities).

In particular, lack of access to higher education is a critical issue for mountain areas. To gain university-level education, many young people have to leave their home region and many of them do not return (Nordregio, 2004), since mountains also lack availability of employment for well-educated people. Similarly to universities', also the density of large hospitals is usually low in the mountains, while hospitals are usually located along the fringes of the massifs (*ib.*).

Loss of population might reduce the capability for upkeeping the landscape (EEA, 1999a), since the ageing trend affecting farming workforce, together with the absence of successors, often implies major structural change in those areas dependent on farming as current farmers retire (MacDonald *et al*., 2000). From this point of view, demographic depletion is one of the main consequences of marginalisation as well as causes of land abandonment: indeed, socio-economic marginalisation decreases valuable employment as well as entertainment opportunities for youngest generations, and ageing of mountain communities do not guarantee any continuity for farmland maintenance in the future, not only as a primary occupation but also as a part-time job or even hobby or civic duty.

Although started already during the 19th century and interrupted during wars or other critical periods, the processes of geographical marginalisation and rural depopulation have been raising dramatically since the end of the World War II and are continuing to occur throughout the mountain areas of Europe (Piussi and Pettenella, 2000). In the last decades mountain areas have been loosing most of the strategic importance they used to have in the past. Several products and raw materials formerly provided by mountains were replaced by alternative goods (plastics, fossil fuels and so on), which in several cases was the primary cause for the marginalisation process to start.

The growth of mechanical transportation technologies and shipping led to the concentration of human economic activities away from the mountains, along the coasts and on the flat plains along the banks of major rivers of the world. In this way, modern industrial centres grew in the plains, while in contrast mountains changed rather slowly and remained largely excluded from the dominant global economic processes. This exclusion of the mountains can be described as marginality, caused by their inaccessibility to the transportation systems developed in the lowlands (Stone, 1992).

The first changes began to take place in the Alps around 1850 with the first railway lines: Alpine agriculture was then exposed to competition from substantially more productive areas of Europe, where growing conditions were more favourable. In the wake of major agricultural crises in all European countries, large-scale collapse began in the Alps between 1870 and 1880, when many Alpine inhabitants ceased farming and migrated to large cities. Migration at that time from the French and Italian Alps was much greater than from the Swiss and Austrian Alps.

By the first half of 20th century industrialisation had become one of the main causes of the total collapse of traditional economic and social structures in the Alps. This has involved breakdown of traditional Alpine agriculture, forestry, local industries (mining, smelting, salt pits) and handicrafts, traditional cultural identity, values and attitudes. Only relicts of this traditional world remain today (*ib.*).

In the meantime, the new perception of the environment and mountains brought about by the industrial revolution was responsible for the development of Alpine tourism. Yet, given the previously widespread breakdown in the traditional mountain activities, such as agriculture, mining and handicraft, the prosperity brought by tourism – as well as industry and transports to some extent – was only of secondary importance and concerned only small areas. The Alps became an economically weak region characterised by a high rate of emigration (*ib.*).

Starting from the fifties, Alpine countries entered a new stage characterised by the transition to a service economy: tertiary sector became prominent and tourism developed from a highly exclusive, elite activity to the current form of mass tourism, consisting of both summer tourism – begun around 1955 – and winter tourism, dominated by downhill skiing and started around 1965. Yet, even mass tourism, although widespread, is not prevalent throughout the Alps; the Alps are so extensive and the competition so intense that many valleys have no chance for this type of development (*ib.*).

Nowadays the mountains of Europe include some very wealthy communities with highly industrialised and/or tourism-based economies (Nordregio, 2004), but also economically weak regions in which the traditional economy and way of life are breaking down and not being replaced by new developments. These regions constitute approximately 40% of the total area in the Alps and they are located primarily in the southern French Alps, the western and eastern Italian Alps, the southern Swiss Alps, the eastern part of the eastern Austrian Alps and the western Slovenian Alps.

The presence of these areas means that European economic and social development has not included every area of the continent, while there are still great disparities between highly developed regions characterised by a solid economic growth and a good population base, and stagnant regions characterised by declining economies and populations (Stone, 1992). In many cases these disparities exist on a very small scale. Such economically weak regions are characterised by a 60, 70 or even 80 per cent drop in population over the past 100 years, a gradual decline in traditional agriculture, and no new jobs in tourism, industry or non-tourist-related services (*ib.*).

Indeed, the image of the Alpine arch as a unique tourist area often leads to an overestimation of the economic role of tourism (Dax and Hovorka, 2004), while the degree of tourism development varies considerably (see Paragraph 1.2): in the Alps, which receive over 100 million visitors a year, only 10% of municipalities have large mono-structured tourist infrastructure, and 40% have no tourism at all. These areas, characterised by less tourist attraction and demand, remain threatened by economic decline and population exodus, and also farming suffers from marginalisation tendencies, so that farmland is gradually converted into forest (Dax and Hovorka, 2004).

The process of geographical marginalisation is closely connected with the concept of rural poverty. Rural poverty encompasses different spatial, temporal and socio-economic dimensions, and it might be defined in terms of people's access to public goods, facilities and assets, or the standard of equipment of their households (Wiesinger and Dax, 2005).

A recent survey carried out by the Austrian Federal Institute for Mountainous and Less-Favoured Areas found out that more than 70% of all poor people in Austria live in rural areas, a great part of which are located in the mountains. Among the most important reasons for rural poverty appeared to be: insufficient individual mobility, long-term unemployment, poor labour market conditions, low income levels, a lack of cheap housing, a lack of educational and care institutions and weak infrastructure (Wiesinger, 2000).

The process of geographical marginalisation has been affecting Italian mountains for a very long time. With a population of over 10 million inhabitants, Italian Alps and Apennines contain some of the wealthiest but also some of the poorest regions in the country: 23 of the 30 wealthiest municipalities are in mountain areas, as well as 27 of the 30 poorest municipalities (Villeneuve *et al.*, 2002). The majority of the 18 million Italians who emigrated abroad during the last 150 years was formed by farmers from mountain territories (Piussi and Pettenella, 2000).

As regards the Italian Alps in particular, the process of geographical marginalisation firstly affected the western regions, namely Liguria, Piedmont and Lombardy to some extent. These regions already started suffering from depopulation and land abandonment at the beginning of the 20th century and the process continued after World War II, when the growing industrial development literally drained mountain populations, who were needed by the cities in the neighbouring lowlands, requiring manpower for the big industrial plants, such as the FIAT and Olivetti, both located in Turin province, as well as the port of Genoa and the metropolitan area of Milan. In these regions many completely abandoned villages can be found, and mountain slopes are mostly covered by secondary forests.

At times when the big urban centres in the lowlands flourished and a great economic growth was booming throughout Europe, Alpine areas and Alpine agriculture in particular were living a period of sharp decline, as many farmers moved to cities and many unfavourable and poorly accessible cultivated areas were abandoned (Stone, 1992).

On the opposite side of the Italian Alps the process started significantly later and it developed differently. Apart from Trentino-Alto Adige, which represents a significant exception within the Italian Alps, the regions of Veneto and Friuli-Venezia Giulia remained significantly behind the north-western regions, from an economic point of view, until the Second World War. Here the industrialisation process only began in the fifties, with considerably different features from those occurring in the western Alpine regions. The eastern regions are actually characterised by a scattered and small scale industrialisation, while big industries are absent, with the only exception of Marghera petrochemical plant, founded already in the twenties near Venice. Thus, industrialisation mainly took place in previously rural areas, and in some cases even in the mountains.

As already mentioned, an outstanding example is given by the world-famous eyewear district located in the mountainous province of Belluno and more particularly in the area called Cadore, where 95% of Italian eyewear producers are located. The district is formed by hundreds of small and medium enterprises, the most renowned of them being *Luxottica*. The presence of many factories around or even within the mountains allowed many people to continue to live in their birth territories, by commuting daily or weekly.

This stopped the process of geographical marginalisation to take place, but could not arrest another, possibly even more dangerous process, which is agricultural marginalisation.

3.2.2 – Agricultural marginalisation

Agricultural marginalisation has to be considered as part of the larger system of rural marginalisation (MacDonald *et al.* 2000), since it occurs both in rural areas affected by geographical marginalisation, where agriculture faces the same problems as the other economic sectors, as well as in rural areas where agriculture is at the margin of economic viability, while other sectors are more profitable. For this reason, greater relevance is given to this kind of marginalisation, which represents by far the most important process leading to farmland abandonment.

Agricultural marginalisation is considered to be "*a process, driven by a combination of social, economic, political and environmental factors, by which certain areas of farmland cease to be viable under an existing land use and socio-economic structure*" (Baldock *et al*., 1996).

Consequently, a marginal site could be defined as one in which "*the present agricultural use yields a factor income which cannot cover the costs of the factor amounts invested in it or, given constant productivity and price trends, will cease to cover them in the next few years*" (CEC, 1980).

Yet, there is no common definition of what has to be meant by agricultural marginalisation and marginal land, which are understood and used in a number of different ways, reflecting the different disciplines which have found them useful and the diversity of conditions found in rural Europe (Baldock *et al.*, 1996). An example is given by the definition provided by Bethe and Bolsius, which referred more to the responses to marginalisation, rather than to the process by itself, by stating that marginalisation is a change in agricultural land use from a more profitable to a less profitable one (Bethe and Bolsius, 1995).

More appropriate is the contribution provided by Pinto-Correia and Sørenson, who referred to marginalisation as a dynamic concept, which is related to the conditions at the moment of analysis and which covers a multitude of factors, including geographical situation, age, financial resources and management qualities of the farmer (Pinto Correia and Sørenson, 1995).

In essence, agricultural marginalisation may be interpreted as an economic concept concerned with the process whereby resources, including land and labour, cease to be deployed in agriculture (Baldock *et al.*, 1996), but the concept of marginalisation refers to different approaches and it can be regarded in terms of social, cultural and environmental aspects as well (Wiesinger and Dax, 2005).

Moreover, a plot of farmland may not be highly productive in terms of volume of output, but the geopedologic, climatic and cultural conditions may be favourable for growing high quality crops, which means that marginality should not be qualified as marginal solely according to its productivity in quantitative terms, but the qualitative aspect should be taken into account as well.

Agricultural marginalisation can occur at different scales, varying from individual plots of land no longer worth cultivating, to local areas or even wide geographical regions. Marginal situations as result of the interaction over time of a combination of factors might thus exist at different geographical levels, as listed as follows (Baldock *et al.*, 1996):

- *Regional* – As already mentioned, agricultural marginalisation can take place in regions which are already affected by a broader process, namely geographical marginalisation. In these areas the possibility of widespread agricultural marginalisation is high, although some agricultural areas might still remain highly productive and competitive;
- *Local* – Within a region certain types of land use become marginal as a result of changing socio-economic and technological conditions. Consequently, those territories where these kinds of land use occurred cease to be viable. Such areas exist even within generally highly productive regions;
- *Farm level* – An individual farm can be marginalized because of its intrinsic features, such as small size, fragmented land, age of farmer and so on. These farms can be either taken over by other, more competitive farmers, or abandoned, depending on the socio-economic context where this process occurs;
- *Within a holding* – A very common understanding of the expression "marginal land" refers to this particular meaning, i.e. individual patches of land which are no longer worth cultivating, because of their physical handicaps, such as steepness of the slopes, difficult access or drainage. These are usually the first areas to be abandoned in case of minor productivity of the land or viability of the farm.

Agricultural marginalisation in the mountains is mainly due to the low productivity which characterises mountain farming and its general inability to compete effectively with intensive production in other regions (Brouwer and van der Straaten, 2002), namely in the lowlands. Yet, several factors influence agricultural marginalisation: beyond the economic context, other important aspects are great changes concerning political frame, financial flows, agricultural structure, physical or climatic conditions. These changes might be rapid and dramatic like the

"*Dust Bowl*", which affected the American Great Plains in the middle of the thirties, but they can also be slow and silent, like those currently determining European uplands abandonment, a phenomenon that is still often undervalued even at the highest political and scientific levels.

Some of the main factors influencing marginalisation are listed below:

Environmental factors

These factors have a fundamental influence on the agricultural potential of an area, since productivity may be severely limited by physical handicaps such as poor soils, lack of rainfall, steep slopes and high altitude, which limit the duration of the growing season. The various definition of less favoured and mountain areas derived from the application of Directive 75/268/EEC at national level are mainly based on environmental parameters such as slope and altitude (Baldock *et al*., 1996) (see Paragraph 2.1).

Altitude represents a natural handicap because winter temperatures decrease and temperature contrasts become larger with increasing altitude, which limits the agricultural use of the land and makes road transport difficult during winter months. A rough topography constrains regional accessibility, makes communication and other infrastructure investments more expensive and hinders agricultural modernisation (Nordregio, 2004).

Geographical location

The location of the area is a crucial factor in determining agricultural viability. In particular, farming may be disadvantaged by poor access to sources of supply and distance from markets, which cause higher input costs and lower competitiveness. Moreover, remoteness is a key factor in determining the possibility to diversify the activities by selling farming products directly or undertaking off-farm activities (Nordregio, 2004). The location also determines tourist appeal and thus the possibility of providing on-farm tourist accommodation.

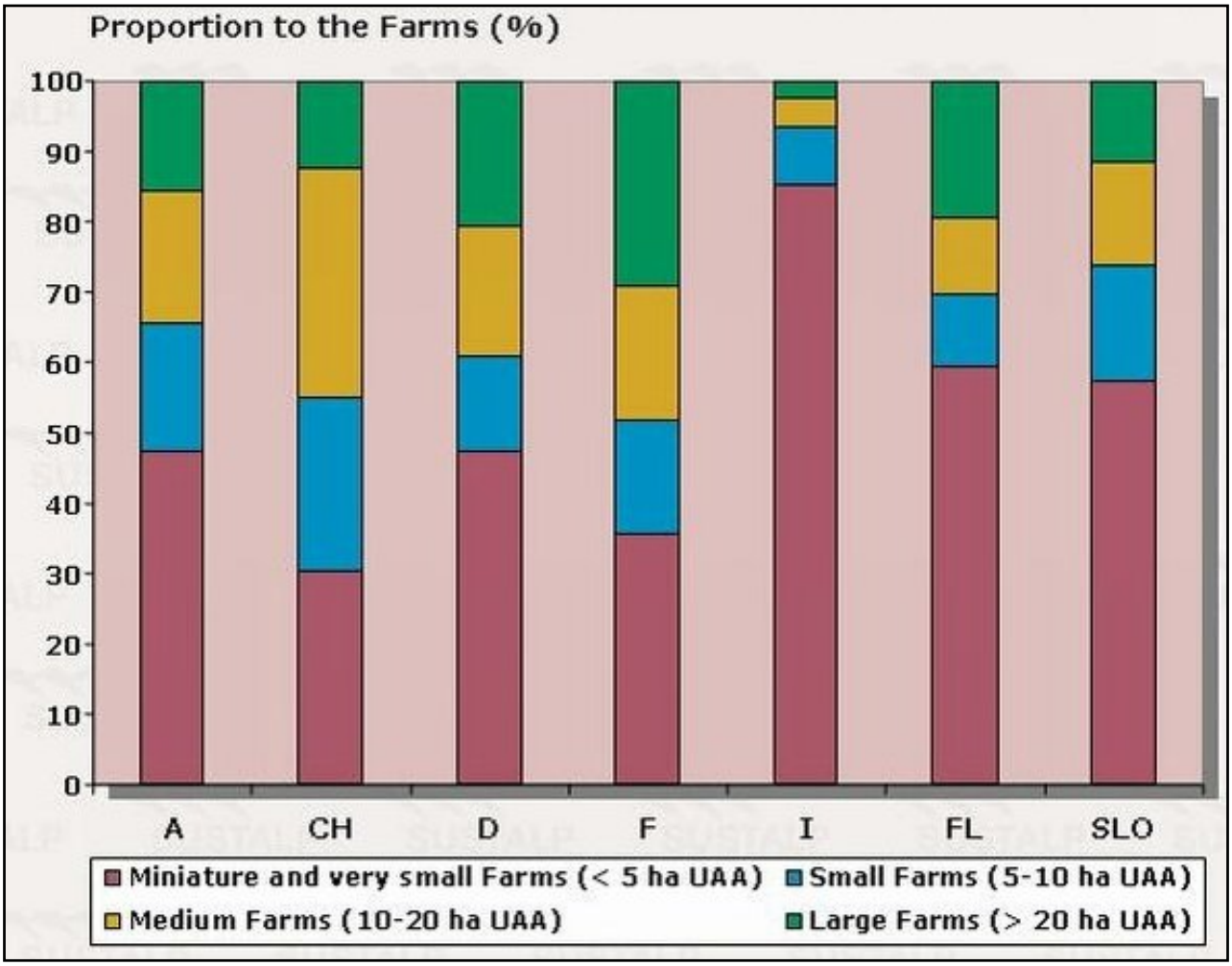
Agricultural structures

The most prominent factors are: the structure of the holdings, such as farm size and shape; land ownership and tenancy structures; rural infrastructure. The provision of infrastructure is important particularly in remote areas suffering from severe physical handicaps, such as areas at high altitude (Nordregio, 2004). As far as the first two matters are concerned, small and/or fragmented holdings are usually less viable: according to the European project SUSTALP – *Evaluation of the instruments of the European Union as regards their contribution to sustainable agriculture in the Alp*s, small-scale grassland farms have been identified as areas particularly prone to marginalisation, even though situated in favourable locations (Tappeiner *et al.*, 2003a).

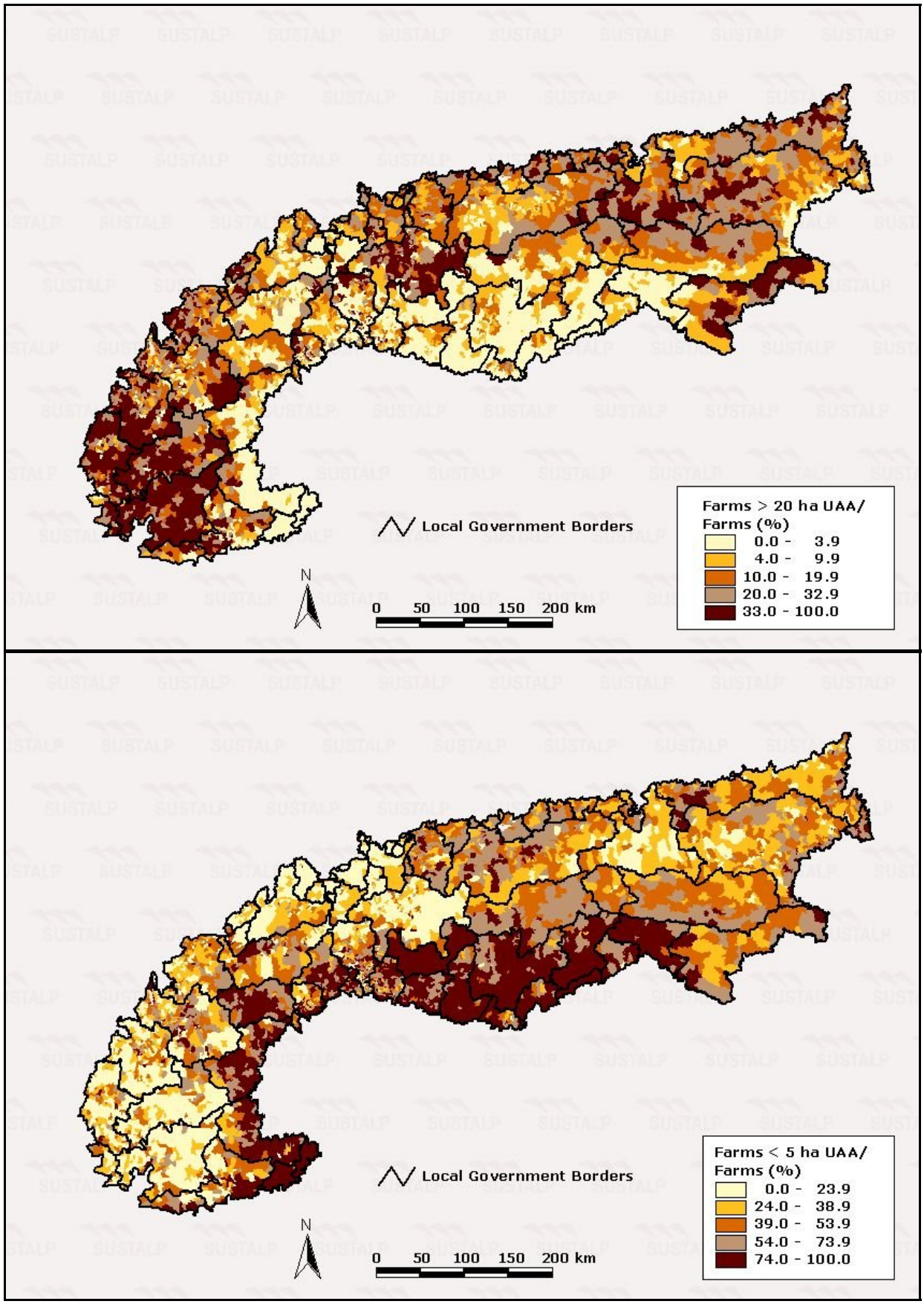
Farm size is closely connected with land ownership and laws of inheritance: in those regions where the whole estate is inherited by one single person, it is more likely that farms remain viable and are not given up. An example is given by the so-called "*maso chiuso*", a rule in force in South Tyrol, according to which only firstborn males can inherit the land, which must not be divided. On the other hand, in those regions following the Napoleonic code, where the estate is equally subdivided among several heirs, farms become less and less viable, thus being significantly more prone to marginalisation and abandonment (see Graph 3.1 and Figures 3.1 and 3.2).

Social factors

Social factors such as the lack of social, educational, health, welfare, sport and entertainment facilities are among the factors leading to geographical marginalisation, of which agricultural marginalisation is one particular aspect. Yet, social factors also include other elements which are typical of agricultural sector, such as the age structure of farmers, their attitude and behaviour and the availability of successors. Indeed, nowadays 68% of farmers in the Alps are older than 45, while the percentage rises up to 76% if we focus on Italy (CIPRA Info, N.6, June 2003) (see Figure 3.3).



Graph 3.1 – Farm size proportion in the Alpine region. Source: Tappeiner *et al.*, 2003b



Figures 3.1 and 3.2 – Distribution of large (above) and small (below) farms in the Alpine region. Source: Tappeiner *et al.*, 2003b

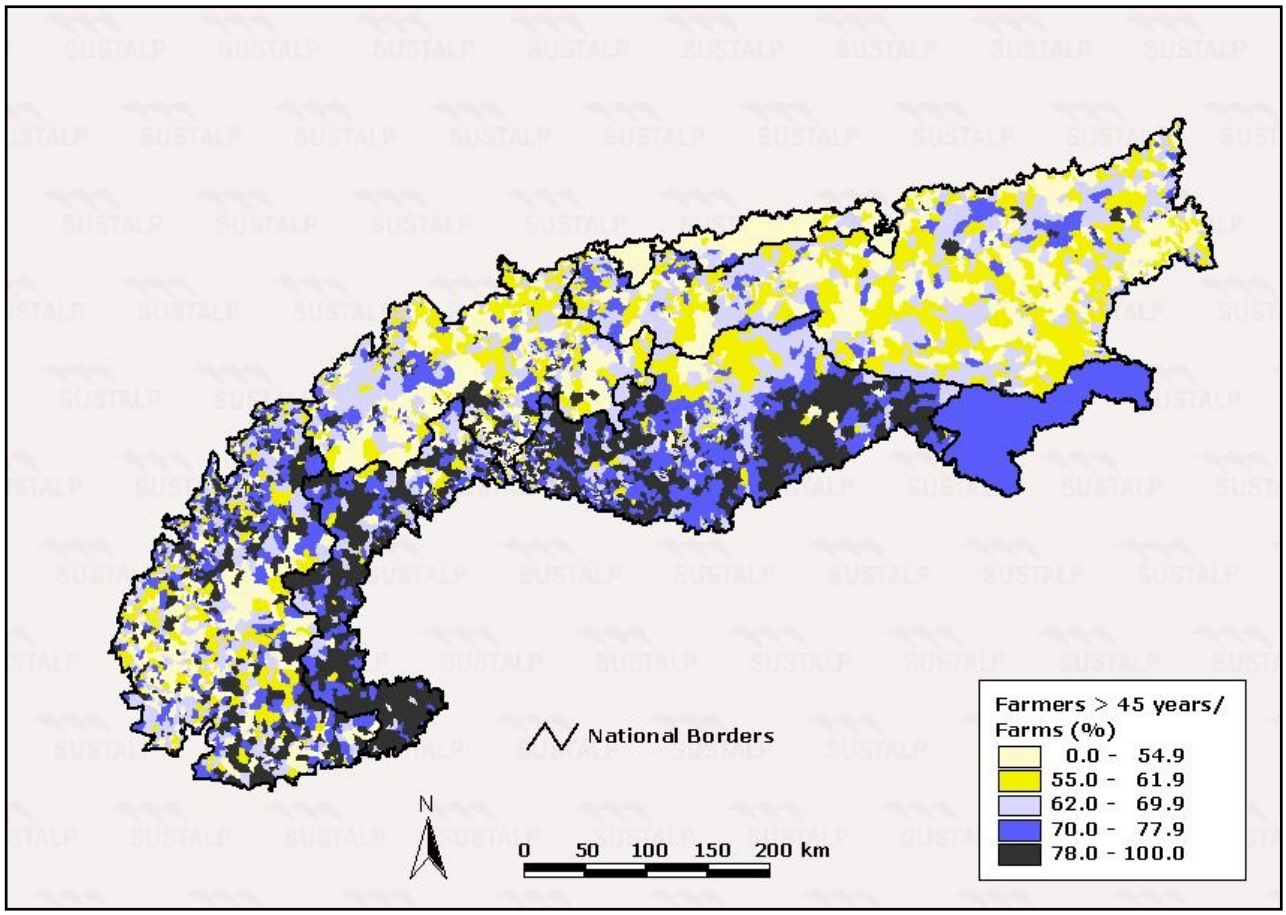


Figure 3.3 – Distribution of the rate of farmers older than 45 years in the Alpine regions. Source: Tappeiner *et al.*, 2003b

As regards the availability of successors, this is closely connected with the attitude to farming, which differs from one country to the other. While in some regions being farm is regarded as conferring social status, in other areas there is a sort of stigma attached to farming (Baldock *et al*., 1996). Once again, a significant example is given by two neighbouring Italian provinces, which are South Tyrol and Belluno respectively. The different social status may be explained by the different history of the two areas: while in South Tyrol farmers have always been land owners at the same time, in Belluno, as well as in the majority of the Italian Alps, farmers were usually tenants or even *mezzadri,* or sharecroppers, who were obliged to transfer half (*mezzo*) of their yield to the landlord. The *mezzadri* did not own the land they cultivated and were usually poor peasants. Although the *mezzadria* came to an end a few decades ago and most of the farmers have nowadays a normal level of income (see below), their social status has not improved significantly since then.

Yet, the lack of successors availability is not always due to the low social status associated to farming. According to a research undertaken by the Federal Institute for Mountainous and Less-Favoured Areas (BABF) among Austrian farmers, while the absence of a suitable heir has been identified as the main cause for discontinuation of farming, the probability of giving up farming

rises with the general educational level of the farm manager, the level and the type of extra-agricultural income and increasing age of farmers (over 40s). On the other hand, favourable factors for continuation of farming are the farmer's level of agricultural training, increasing farm size, the growth of a positive development dynamic of the farm and the increasing age of the farmer until the mid-40s (Groier, 2004a).

Slightly different are the motivations deterring potential heirs to the farm from continuing farming: above all, other professional and life expectations, no enjoyment in farm activities, lack of profitability, absence of perspectives for development and the expected heavy burden of work. Along with these factors, an occasional poor job image due to a negative transformation in the image of farmer is also mentioned, even though the issue of discontinuation of farming is a taboo in the villages and farms: continuation of family activity is still perceived as a duty within many mountain communities, bringing about sharp conflicts within the families concerning farms' succession.

The report also underlines, beyond the agri-policy problems related to farming discontinuation, also its destabilising effects on the economy of less-favoured regions as well as the socio-psychological implications: indeed, in many cases the separation from the agricultural enterprise represents a painful concluding point at the end of many years of overwork and often desperate attempts to keep the farm (*ib.*).

However, it is worth mentioning that giving up of farming does not necessarily lead to farmland abandonment, since farms may be taken over by other, bigger enterprises, resulting in a reduction of the total number and an increasing size of farms.

Economic factors

These factors are crucial in determining farms' economic viability. Among the most important factors is competition from other agricultural areas and production systems, which determines a decline in competitiveness. Other factors are relative costs of inputs, especially labour force, availability of capital or loans and alternative employment possibilities (Baldock *et al.*, 1996). On this purpose, the availability of off-farm activities may result in the maintenance of farming as a part-time job (see Figure 3.4) or, on the contrary, in the giving up of farming and land abandonment.

The difference in the outcomes very much depends on the socio-economic context where the process takes place as well as the policies implemented, since diversification of economic activities might be considered as a policy-driven process (see Paragraphs 4.3 and 7.4).

Market prices and changes in demand for farm products are also significant factors, since demand for the specialist products of certain rural regions contributes to the survival of farming systems which otherwise would not be viable, such as the Protection of Geographical Indications (PGI) and Protected Designations of Origin (PDO) agricultural products.

Finally, rising costs of living and rising income aspirations, combined with relatively limited incomes provided by agriculture, are another reasons for farming activities to become marginal (*ib.*). On this purpose, statistics describing the distribution of farm incomes and the average changes in farm income, although important, are often not particularly significant, since they fail to reveal the extent to which some farmers move up and down within the different income categories, while others are "trapped" in low incomes, being at the margins of or even lower than economic viability.

Indeed, a distinction should be made between farms facing occasional periods of low income and those which suffer from persistently low incomes. In the latter case low farm income has to be seen as a problem, while in the former case farms are much less prone to marginalisation.

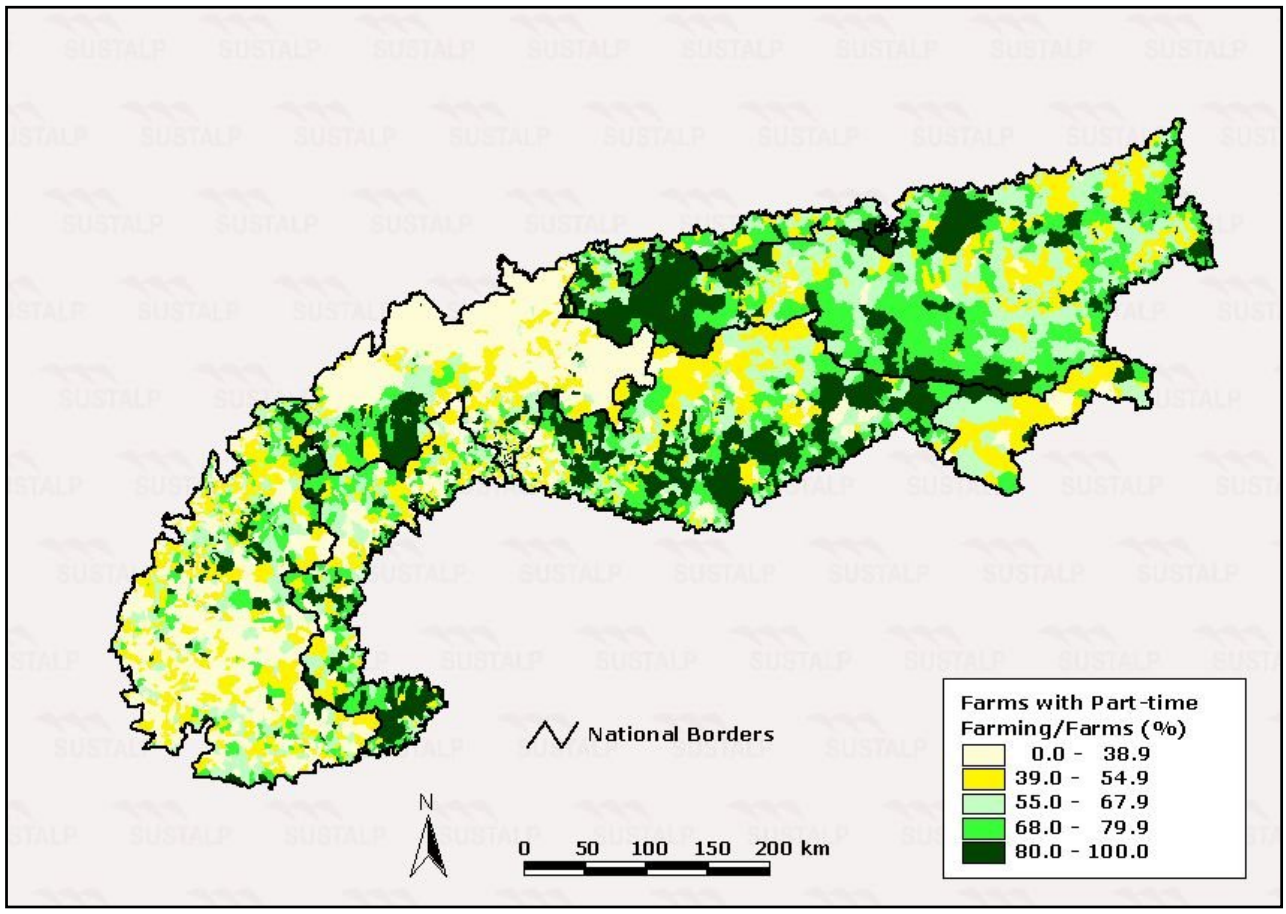


Figure 3.4 – Distribution of part-time farmers in the Alpine arch. Source: Tappeiner *et al.*, 2003b

On this purpose, a research project funded by the Scottish Executive Environment and Rural Affairs Department (SEERAD) and run by the University of Aberdeen recently focused on the factors associated with movements into and out of the lowest income quintile (Phimister *et al.*, 2004). The research, which based its analysis on the data on the Net farm Incomes (NFI)[1] provided by the Scottish Farm Account Survey (FAS) from 1988/89 to 1999/2000, revealed that, although income mobility in Scottish agriculture is high, 11% of farms in the sample experienced persistent low incomes, staying within the lowest income quintile for a minimum of six consecutive years.

The main farm characteristics influencing the probability of movements into and out of low farm income quintiles are age of farmers and farm size: being a small farm run by an older farmer significantly reduce the probability of escaping from the lowest income quintile. Conversely, being located in a Less-Favoured Area increases the probability of exiting a period of low-income, possibly thanks to the subsidies provided in that case, which reduce the uncertainty and flexibility of the income (*ib.).*

Policy factors

Agricultural, regional, economic, trade and environmental policies play a fundamental role in determining whether areas are marginal (Baldock *et al.*, 1996). Trade barriers, support measures and investment aids may either encourage or hinder marginalisation processes. The most important instruments to this end are the community, national and regional agricultural support measures, whose influence on mountain farming will be analysed in Chapter 7. However, it is worth mentioning that CAP market measures, as well as the establishment of a free internal market within the EU and the consequent removal of trade barriers have often resulted in an intensification of production in those areas which benefited from a comparative advantage, and a decline in production in less competitive regions, such as mountain areas (*ib.*).

Other significant policy factors are environment and nature conservation policies, such as the designation of protected areas, and land-use planning, which is particularly important in central and peri-urban areas, where farmland is sometimes taken out of production because of planning decisions for residential or industrial development, extension of infrastructure or recreational facilities (Bolsius, 1998).

[1] By considering only Net Farm Incomes, non-farm components of agricultural households incomes have not been taken into account.

CHAPTER 4 – PRESSURES

4.1 – The possible outcomes of agricultural marginalisation: intensification *versus* extensification

A range of possible reactions may be undertaken by farmers facing the threat of marginalisation. Unless farmland is sold and/or utilised for other purposes than agriculture, e.g. urban building or nature conservation, all of the other possible outcomes can be traced back into two opposite, yet specular processes, which are intensification and extensification of agricultural production[1] (Brouwer *et al.*, 1997; Dax and Wiesinger, 1997 and 1998; Euromontana, 1997 and 1998; Bolsius, 1998; EC and Eurostat, 1999; EEA, 1999a; Caraveli, 2000; MacDonald *et al.*, 2000; Brouwer and van der Straaten, 2002).

Even when farms are given up and taken over by other farmers, agricultural production might either be intensified or extensified: yet, since this process leads to a decrease in number and an increase in size of farms at the same time, it is more likely that a process of intensification takes place, following the establishment of larger and more viable holdings.

Under certain circumstances, intensification of production represents the most profitable solution, especially where financial incentives are available in the form of production–oriented subsidies. Where greater agricultural productivity is not possible or does not appear as a viable option, a gradual running down of farming activities is likely to occur (Brouwer *et al*., 1997).

Both intensification and extensification exert pressures on the environment, the first implying risks of pollution as well as over-exploitation of natural resources and the latter often leading to abandonment of agricultural land. Nowadays intensification and abandonment are the main pressures influencing the landscape shaping process of rural mountain areas in large part of Europe (Hunziker, 1995).

An international study coordinated by Euromontana on behalf of the European Commission in 1998 and titled "*Integration of Environmental Concerns into Mountain Farming*", provided a comparative analysis of 25 European mountain case studies in order to assess the environmental

[1] Also the shift towards urban building and nature conservation might be seen as a process of intensification and extensification, respectively; yet, in this case these terms are meant in a broader sense, since they do not refer to agricultural production, but to land uses.

impacts of land abandonment and decline in traditional labour intensive farming practices. The study areas were classified into six Regional Networks, namely: Dry Mediterranean Mountains, Northern Regions, Central and Eastern Alps, Western Alps, Oceanic Regions and Central Pyrenees.

The research found out that land abandonment is widespread, since it affects all of the six geographic regions and 19 out of the 25 case studies (yet, 2 out of the 5 case studies which do not suffer from land abandonment are affected by abandonment of traditional practices); similarly, intensification also concerns all of the geographic regions with the only exception of the Central Pyrenees, affecting 17 case studies. Consequently, 14 case studies are characterised by intensification in conjunction with some form of abandonment (Dax and Wiesinger, 1997 and 1998; Euromontana, 1997 and 1998; MacDonald *et al*., 2000).

As regards the Alps, land use intensification is a particular local issue concentrated in favoured areas such as valley floors, the more easily accessible and gentle slopes exposed to south and even high mountain pastures to some extent (Dax and Wiesinger, 1997; EEA, 1999a). On the other hand, Utilised Agricultural Area (UAA) is steadily decreasing in all case studies and land abandonment is widespread in marginal land and pastures at intermediate altitudes, particularly in Western Alps.

Many of the factors described in Chapter 3 were identified as the main causes for farmland abandonment and intensification: as far as the former is concerned, the main driving forces which have been identified by the study are the poor profitability and income prospects, the fragmentation of the holdings (mainly in Central and Eastern Alps) and the shortage of agricultural manpower due to the strong development of secondary and tertiary sectors, determining a shift to less labour-intensive farming systems. On the other hand, intensification was driven by the attempt to raise agricultural profitability (Dax and Wiesinger, 1997 and 1998).

Furthermore, the research project revealed that abandonment generally has an undesirable effect on the environmental parameters examined, representing one of the main pressures exerted on the environment in most of the case studies considered (Euromontana, 1998; MacDonald *et al*., 2000).

In many cases it has been the transition from subsistence agriculture to a market oriented one to bring about a process of intensification of the potentially most productive land, in order to increase output per hectare and eventually improve viability of farms (Brouwer *et al.*, 1997).

Intensification implies:

- the expansion of irrigation on the fertile areas[1];
- a greater use of agrochemicals such as fertilisers, which obviate the need for fallowing;
- a shift in land use, and particularly an expansion of arable land at the expense of permanent grassland (Beaufoy *et al.*, 1994; Caraveli, 2000).

In Italy the process of agricultural intensification has been quantified through a Concentration Index (CI) of Agricultural Gross Product (AGP), which is considered to be the best indicator of agricultural intensification. The CI was found to have increased from 0.26 in 1960 to 0.40 in 1989, meanwhile AGP was found to have increased substantially, mostly in lowland areas (Bordin *et al.*, 1998). Indeed, these changes mainly affected lowlands, where more favourable climatic and soil conditions allowed intensification to occur.

In the mountains three different trends may be observed as regards intensification (Baldock *et al.*, 1996):

- concentration of arable land and meadows in the most fertile valley floors;
- spreading of mono-cultivation in the inner semi-mountainous and high hilly areas, with particular regard to vineyards and orchards such as apple and pear trees;
- shrinkage within farm holdings, involving the concentration of production on the most suitable land and the running down of less fertile or accessible patches.

Even though there has been a significant reduction in the extension of arable land within the Alps in absolute terms (see Paragraph 5.2), an intensification of this kind of land use in the valley floors can be observed. Yet, wherever monoculture develops (both in agricultural and in social terms), economic as well as social and environmental risks occur, due to the low flexibility level of the whole system.

Pressures to maintain farm incomes may thus result in an intensification focused on more accessible, higher quality land, which is typically closer to the farmhouse. The intensification on some patches of the holdings is usually associated with the abandonment of other parts, thus representing a rationalisation of farming activities at farm scale (MacDonald *et al.*, 2000).

Although intensification and extensification might both take place at farm level, yet extensification is by far the most common process occurring in mountain areas as response to marginalisation trends, because of the severe constraints on intensification and farming altogether, such as the high altitude, the frequently poor and slow formation of soil and the interdependence

[1] In Italy the share of irrigated area in total UAA increased by 2% (from 6 to 8) between 1985 and 1993 in LFAs (Eurostat, 1997).

of precipitation and warm temperatures, which often gives rise to situations in which there is too little precipitation and too much sunshine or *vice versa*, both limiting development of vegetation. For all these reasons, truly optimal conditions for vegetation growing in the Alps are usually confined to small areas (Stone, 1992).

Conversely to what happens in the former process (i.e. intensification), extensification involves a reduction in the level of input use per unit of land. Since this process often takes place in areas which are already extensively managed – i.e. the input in terms of agrochemicals and irrigation systems is low – the input which is cut is typically represented by labour force. Indeed, if the decision to give up production is to be interpreted as the result of a cost-benefit reasoning concerning land use (i.e. marginal land is abandoned where benefits are lower than costs), opportunity cost of labour is then a key cost-related variable. Major increases in the cost of rural labour since the sixties have actually been a key factor in this process (Beaufoy *et al.*, 1994).

Opportunity costs of labour are on the one hand dependent on exogenous factors, such as the level of economic development and the market labour in particular; on the other hand they are determined by endogenous factors, such as education and social expectations (Bebi and Baur, 2002). Inputs such as labour force might then be reduced to a level of optimalisation, resulting in a more effective combination of production factors (Baldock *et al.*, 1996) and eventually a more economically viable system, as production is rationalised and labour costs are reduced (Beaufoy *et al.*, 1994).

When this reduction is not enough and the market conditions require to diminish the level of input even further, i.e. beyond the point of optimalisation, this usually leads to land use change or even abandonment (Baldock *et al.*, 1996).

However, land abandonment is not an automatic outcome deriving from extensification; possible management choices which farmers may implement in order to stave off marginalisation and maintain viability include:

- a simple reduction of inputs, stocking densities or maintenance of infrastructure, without any significant alteration of the existing agricultural land use (Baldock *et al.*, 1996);
- a change from one agricultural land use to another, e.g. from crops to permanent grassland (Brouwer *et al.*, 1997) or from meadows to pastures (MacDonald *et al.*, 2000). This process often implies a transition from a mixed farming system into livestock production only;
- complete farmland abandonment, occurring when none of the other possibilities is either feasible or desirable by the farmer (Brouwer *et al.*, 1997).

While the first possibility implies a quantitative reduction of both inputs and outputs, the second leads to a qualitative land use change from a more profitable to a less profitable land use. The last possibility will be further discussed in the following paragraph.

4.2 – From extensification to abandonment

Extensification might trigger a process of agricultural decline leading from extensification to abandonment through a series of different stages (Baldock *et al.*, 1996). The process might be slow, passing through an initially limited reduction of inputs and maintenance of infrastructure which gradually increases going beyond the limit of viability and finally leading to total abandonment. On the contrary, the process might also be rapid, bringing to complete abandonment in quite a short time; this happens for example when a farm is given up and nobody takes it over.

Indeed, farmland abandonment is sometimes propelled by the retirement of an older generation of more traditional farmers who usually accepted low living standards, while newer generations have other expectations and look for other occupations offering greater financial and social rewards and smaller burden of work (Keenleyside *et al.*, 2004).

The shift from extensively managed to abandoned land is driven by a combination of economic, environmental and social factors, which are often closely interconnected each other. As mentioned above, extensification mainly takes place in areas which were already extensively managed, thus meaning a further extensification, especially in terms of reduction of labour force, one of the major inputs used in this farming systems, which are often traditional labour-intensive practices.

The total abandonment of a plot of land is often preceded by the abandonment of some management practices and particularly of those requiring more labour force such as the maintenance of terraces, hedges and stone walls, hay-making and the shepherding of livestock (Baldock *et al.*, 1996; Brouwer and van der Straaten, 2002). As these labour intensive practices are gradually running down, traditional and relatively complex farming systems tend to be simplified (Beaufoy *et al.*, 1994; Baldock *et al.*, 1996).

For example, because of the decrease in shepherding of livestock, animals often graze unsupervised, with the result that grazing is concentrated in areas that are level, very favourable, and easy to reach, while the remaining areas are hardly used at all. There is severe overgrazing in the good areas, with the corresponding ecological problems, while pronounced underuse is

apparent in the remaining areas (Stone, 1992). Moreover, as it will be further explained in Chapter 6 and particularly Paragraph 6.4, pastures which are surrounded by under-utilised or abandoned pastures, or are under-utilised themselves, are usually invaded by unpalatable species, which cause a decrease in the quality of milk and other dairy products; these pastures become less and less viable, so that they are eventually abandoned (Baudry and Asselin, 1991; Höchtl *et al.,* 2004).

Diminishing grazing pressure differs from abandonment in that human activity is still present, although to a more limited extent; on the other hand, it is similar to abandonment because it lets some type of ecological succession to take place (Baudry and Asselin, 1991). Undergrazing can thus be expected to ultimately result in a decline in grazing value itself (Brouwer *et al.*, 1997), finally leading to a further running down of zootechnical activities and the complete desertion of mountain pastures.

Along with the environmental factors, also socio-economic aspects play an important role in determining the establishment of a vicious circle leading from extensification to abandonment, since the difficulties and costs a farmer has to face while being alone and isolated are significantly higher than in the case where there are many farmers sharing costs and infrastructures, either in form of co-operative or other associative systems.

In order to better understand the link between extensification and abandonment and the role that land abandonment plays as pressure on the environment, an explanation of what has to be meant by abandonment is needed. In general terms, we can refer to land abandonment as that process "*taking place when the neglect of the main productive elements is allowed to decline beyond a point at which recuperation is practical, or economically viable*" (Baldock *et al.*, 1996; Brouwer *et al.*, 1997).

Nevertheless, the concept of abandoned land is rather complex and often not clearly defined. First of all, a distinction between farmland and land *tout court* has to be taken into account: while *land* has not a precise connotation, *farmland* is that land which is cultivated or otherwise exploited for agricultural purposes. According to the Commission Regulation (EC) No 746/96 of 24 April 1996 "laying down detailed rules for the application of Council Regulation (EEC) No 2078/92 on agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside" (no longer in force), "*farmland may be considered abandoned if it has not been the subject of any agricultural use or farming activity for at least three successive years and if it has not been included in a crop-rotation scheme during that period*".

Yet, even the notion of farmland abandonment can be regarded as a relative concept: for example, commentators from regions where intensive forms of agriculture dominate consider rough grassland and scrub managed under extensive grazing regimes as form of semi-abandonment (CEC, 1980), while large areas of only sporadically managed land and land under very extensive farming systems are quite common in many parts of Southern Europe (Baldock *et al.*, 1996).

Another misunderstanding comes from the improper usage of the term "abandoned land" when referring to situations of deliberate abandonment and planned withdrawal from agriculture, such as the set-aside scheme, where land cultivation is temporarily and/or intentionally suspended.

A criterion for distinguishing the different kinds of abandoned farmland is the reason for abandonment: in German, for example, there are several terms referring to abandoned land, each of them having a different meaning specifically referring to the reason for abandonment. *Sozialbrache* refers to farmland which has been abandoned for social reasons, for example as a result of geographical marginalisation and more specifically out-migration and abandonment of settlements located at high altitude. *Strukturbrache* refers to abandonment caused by structural weakness, such as small and/or fragmented holdings or poor infrastructure. *Grenzertragsbrache* refers to farmland which has been abandoned mainly for its physical conditions, such as poor soil, steep slope, high altitude, harsh climate and so on (CEC, 1980; Brouwer *et al.*, 1997). *Spekulationsbrache* refers to farmland which is temporarily out of use and is likely to be utilised for a non agricultural use, such as urban building (Baldock *et al.*, 1996).

According to Pettenella the process of abandonment itself might be differentiated in three different categories (Pettenella, 1984):

- *Desertification* - By desertification is meant a process by which the excessive or improper usage of an area leads to its impoverishment in terms of loss of fertility, increasing erosion, instability of the slope and so on. Possible causes might be long-term over-grazing, deforestation of wide areas, radical hydrological or hydrogeological changes affecting water catchment and run off;
- *Physiologic abandonment* - This process occurs in those agricultural areas which are no longer economically viable due to increasing production costs, technological development or a strong demand for alternative land uses;
- *Under-utilisation* - This is a broad term referring to all those forms of utilisation which represent a sub-optimum exploitation of a certain territory.

Another criterion for the classification of the various kinds of abandoned land is the temporal factor: on this basis, three main kinds of abandoned farmland might be distinguished (Baldock *et al.*, 1996):

- *Farmland which is only temporarily out of use* - This category comprises:
  - farmland which is under sporadic management;
  - farmland which is no more utilised by the former owner, but it is likely to be taken over by a new owner or tenant, while being maintained under agricultural management;
  - farmland which is set-aside under the Common Agricultural Policy (CAP) arable regime.
- *Farmland which is out of use on a more permanent basis* - This category comprises:
  - farmland which is under long-term set-aside schemes mainly for nature conservation purposes;
  - farmland which is no longer utilised by its owner but continues to be sporadically exploited by transhumant livestock;
  - farmland which has been abandoned on an apparently permanent basis and is neither exploited nor managed.
- *Farmland which has been converted to other uses* - This category comprises:
  - farmland which has undergone a planned conversion to another use, such as urban building, forestry, reservoirs;
  - farmland which has come under another use following spontaneous evolution after its abandonment.

For the purposes of this research two particular kinds of abandoned farmland are considered: farmland which has been abandoned on an apparently permanent basis and is neither exploited nor managed, together with farmland which has come under another use following spontaneous evolution after its abandonment.

4.3 – Diversification as alternative possible outcome

Although not always feasible, a third way – beyond intensification and extensification – is represented by diversification of economic activities within the farm, such as quality produce, nature or agri-tourism , or even a combination of on-farm and off-farm activities.

However, this valuable opportunity is often limited by remoteness and physical disadvantages, which reduce competitiveness and place severe limits on technical and structural adaptation. Moreover age, constraints on skills, ingrained tradition and aversion to risk taking, together with small farm size, especially affecting Southern Europe, can stand in the way towards economic diversification and innovation (Campagne *et al.*, 1990; Walther, 1986).

Diversification might be considered as a positive process, which allows the continuation of farming while ameliorating the socio-economic situation of farmers by increasing their income level and social relationships. Thus, diversification cannot be referred to as a pressure on the environment, except for the case where pluriactivity leads to some forms of land abandonment, by reducing time availability or interest for labour-intensive farming activities, with a consequent decline in these practices (MacDonald *et al*., 2000). In any other case the positive impacts provided by diversification of farming activities are usually greater than the negative ones.

Moreover, diversification needs a well developed socio-economic context to succeed, since it requires either a wide availability of off-farm activities or the possibility to develop non-agricultural on farm-activities, such as rural tourism. For all these reasons diversification seldom represents a spontaneous outcome deriving from marginalisation processes, while usually being a policy-driven response. Diversification will therefore be treated amog the responses (see Paragraph 7.4 and Chapter 9 as regards the role of diversification in the Austrian experience).

4.4 – Indicators of marginalisation and the role of social capital in rural development[1]

Several attempts have been made by rural and agricultural economists, rural planners and sociologists to find proper indicators which could define and describe the process of marginalisation and the pressures it exerts on environment and societies. Some of the main efforts have been made by Floor Brouwer, who undertook a research study in 1996 aimed at exploring a

[1] This paragraph is mainly based on the work undertaken by the author within the project *EUROLAN – Strengthening the Multifunctional Use of European Land: Coping with Marginalisation*, funded by the European Commission within the 5th Framework Programme, Quality of Life and management of Living Resources, Key action 5 (Sustainable Agriculture, Fisheries and Forestry and Integrated Development of Rural Areas including Mountain Areas). The author was involved in the project during her 4-months research period at the Federal Institute for Mountainous and Less-Favoured Areas (BABF) in Vienna, one of the project partners. The paragraph is based in particular on an unpublished paper titled "*The role of social capital in rural development - Conclusions from a European project on marginalisation and multifunctional land use*" and written by the author together with Wiesinger, Vihinen and Tapio-Bistrom, an abstract of which was presented by Wiesinger at the XXI Congress of the European Society for Rural Sociology (ESRS) – *A common European countryside? Change and continuity, diversity and cohesion in an enlarged Europe*, held from 22 to 26 August, 2005, in Keszthely, Hungary.

set of indicators which were potentially critical to an assessment on processes of marginalisation and abandonment of agricultural land in Europe. Through a cluster analysis group of regions were identified, which were considered to be susceptible to marginalisation and farmland abandonment.

According to the study undertaken by Brouwer in 1996 two types of territories were identified as being particularly vulnerable to marginalisation and abandonment: regions characterised by extensive agriculture and territories mainly affected by small-scale farming (Baldock *et al.*, 1996; Brouwer *et al.*, 1997). While the former group mostly included relatively big farms with low density of livestock population, the latter one was characterised by relatively small farms with an average of 5 ha, running rather intensive farming practices. Moreover, in this latter category the share of farm holders of 55 years or more was about 60%, the share of farmers older than 65 being about a third of the total (Brouwer *et al.*, 1997). Both kinds of farming systems cover most of Italy (Baldock *et al.*, 1996), and they dominate mountain zones (MacDonald *et al.*, 2000).

Similar results have been obtained by the European project SUSTALP – *Evaluation of the instruments of the European Union as regards their contribution to sustainable agriculture in the Alps*, which identified small-scale grassland farms in favourable locations with a surplus of labourers as being particular prone to marginalisation; this agrarian structure is to be found almost exclusively at the southern border of the Italian Alpine arch (Tappeiner, 2003a) (see Paragraph 5.2.2 for further details).

A second attempt by Brouwer is presently being made through the European funded project EUROLAN – *Strengthening the Multifunctional Use of European Land: Coping with Marginalisation*, aimed at recognising the areas most in danger of marginalisation through the identification of a set of site-specific indicators of vulnerability to marginalisation. The project, involving ten partners from ten different countries, also aims at developing a set of recommendations and tools for appropriate land use based on a selection of ecological, cultural and socio-economic criteria for policy and decision makers at local, national and EU level.

An initial hypothesis of the project was that a set of indicators could be determined enabling to understand the extent of marginalisation in terms of land abandonment, economic and socio-cultural decline in various European countries. In a second step it was intended to fix thresholds permitting explications on marginalisation in various countries. Along with the analysis of national trends, seven case studies at municipal level have also been considered.

The marginalisation indicators selected within the EUROLAN project referred to agricultural development (e.g. land use, land abandonment, net farm income, agricultural subsidies, afforestation), demographic and socio-economic issues (e.g. population density, gender relation, age groups, employment, commuting accessibility of the region) and environmental patterns (e.g.

biodiversity, landscape diversity, pollution). Some of the indicators were applied in all the countries, others only in a few according to data availability. Most of the partners also made up country-specific or local-specific indicators to clarify specific marginalisation processes. The main common indicators were:

- land use and land cover;
- population density;
- gender relation;
- economically active/inactive persons;
- net farm income per capita;
- ratio of agricultural subsidies in net farm income;
- accessibility of the regions.

These indicators were rated and weighted by relevance in positive or negative correlation with marginalisation, the level of which could be exemplified by certain thresholds for an interregional comparison. Policy measures and instruments could then be assessed according to suitability and effectiveness in combating marginalisation.

Yet, concerns arose from some partners about the significance of these selected indicators, since the process of marginalisation does not only depend on socio-economic development, regional, agricultural and environmental policies, but also on global trends and on so-called intrinsic factors of local communities, which refer to the importance of local "social capital" and "networks". The dilemma which emerged was that the information provided by indicators was not consistent to give a real picture of marginalisation. In other words, marginalisation indicators did not prove to be comprehensive tools in identifying and testing marginalisation and abandonment trends. Even though unfavourable conditions and lack of proper resources can often be identified as the main driving forces of marginalisation, many times and in many regions these factors are not sufficient to justify marginality, nor are they necessary to determine a marginal situation. Some regions with a very sparse population, lack of policy measures, poor economic and unfavourable climatic conditions proved to be more viable than regions with much better circumstances. So the question arose: why are marginalisation indicators not giving a reliable explanation nor assessment of the state of marginalisation in the area? An attempt to evaluate whether the social capital approach could be a way to fill the missing link and to gain a better understanding of marginalisation was then made, meaning by "*social capital*" the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalised relationships of mutual acquaintance and recognition.

Social capital is fast becoming a core concept in a variety of academic disciplines and policy circles. Since the beginning of the eighties and even more during the nineties plenty of surveys have been conducted and an increasing number of studies and articles have been published (Bourdieu, 1979 and 1986; Coleman, 1988; Putnam, 1993 and 2000; Woolcock, 1998; Fukuyama, 1999; Burt, 2000; Tillberg Mattsson and Stenbacka, 2004; Árnason *et al.* 2004). Bourdieu and Coleman, from whose work the idea originated, emphasized the importance of social ties and shared norms to societal well-being and economic efficiency, while Putnam above all linked the idea of social capital to the importance of civic associations and voluntary organisations. The volume of the social capital possessed depends on the size of the network of connections one can effectively mobilize. Just recently Árnason *et al.* discussed the concept of social capital in the context of rural development. They consider this concept as an attempt to capture the non-economic aspects of society that promote economic growth or more widely positive effects. Social capital may affect the performance, competitiveness and social cohesion of a community, while networks can be understood as articulating the flows of information and resources that produce rural development and society more generally. Focusing on networks therefore will allow to investigate the mechanisms by which people capture or contain benefits of development.

For conceptualising the role of social capital as an explanatory factor of the relationship between the implementation of policy measures and a given state of marginalisation in a rural region Putnam's approach as it has been developed in his basic study "*Making Democracy Work*" was mainly followed. Here Putnam has established a connection between the degree of civic engagement in voluntary organisations on the one hand, and a well functioning democracy and economic growth on the other (Putnam, 1993). Putnam's perception of social capital refers to features of social organisation, such as trust, norms and networks of civic engagement (i.e. associations). When individuals have lived together in a local community for a substantial period of time, they are likely to develop shared norms and patterns of reciprocity and thus they possess social capital. Mutual trust fosters cooperative norms, which together with networks lubricate cooperation. Dense networks foster norms of generalised reciprocity and trust as well. Norms lower transaction costs and facilitate cooperation.

Networks of civic engagement like neighbourhood associations, choral societies, cooperatives, sports clubs, mass-based parties represent intense horizontal interaction. The radius of trust is the circle of people among whom cooperative norms are operative (Fukuyama 1999). Social capital thus promotes access to resources (Rifkin 2001) and it is assumed to be produced by networks. Tillberg underlines that networks can also be formal, with an explicit and public structure, or informal, with no explicit name (Tillberg *et al.,* 2004).

Coleman (1988) offers a simple way to measure social capital. The number of contacts indicates the extent of an actor's social capital. A contact consists of a direct relationship with another actor. Since the number of contacts between persons, groups or organisations varies considerably, social capital is a variable quantity. The number of associations per local inhabitants as it was suggested by Putnam (1993) is one of the tools for measuring social capital.

Yet, both Coleman and Putnam just say very little about the structure of local population which is attracted by those associations and about the gender issue. Some inhabitants could be member in several associations or local networks, while others are socially excluded. Women, young people and persons with special lifestyle or cultural interests may find themselves not affected by the existing associations. On the other hand, women are often the promoters of social cohesion with their both formal and informal networks. For instance, it has been noted that in Finland women dominate the Local Action Groups (LAGs) and the various development activities supported by the LEADER programmes.

Another aspect, which has also been highlighted by Putnam, is the threat of patron-client politics, personalism and centralisation of decision making power in contexts with lacking social capital. In the absence of horizontal solidarity, vertical dependence appears to become a rational strategy for survival. The performance of patron-client politics could seem to be quite successful at least for a limited period, when one powerful decision maker controls the whole development. Yet, this will create no sustainable situation. As soon as the only or the few key actors will drop out of position, the society will prove its incoherent character and social fragmentation. This might be one of the reasons why a successful rural development does not necessarily coincide with a high amount of social capital, at least when we just observe a limited period.

A consideration was also undertaken about the role of rural development policies, in terms of the institutional means they foresee to create and foster social capital. Policy measures can affect social capital both positively and negatively, by enhancing or weakening it. Initiatives which encourage the creation of networks and working modes enhancing co-operation are important elements in the creation of social capital. On the other hand, policies encouraging competition dividing rural inhabitants into winners and losers might be detrimental to the positive development dynamics and could mean a total break down of the rural social fabric. On this purpose, the role of EU in introducing innovative local modes of organisation and cooperation through the establishment of the Local Action Groups (LAGs) fostered by the LEADER-programmes has also to be acknowledged.

Close relationships amongst people and long-term individual experience with a territory enhance social capital. However, we shall also consider some negative aspects of this "territorial imperative". As much as local communities are prone to enclose their citizens and assist persons in need, their close ties also account for dynamics of social exclusion of all those who are unable or not willing to cope with the strict norms of the community. Young people with different cultural lifestyle, persons who own deviant political opinions from the majority, those who do not participate in local associations or religious congregations or simply new incomers may experience the negative side of locality (Dax and Machold, 2003).

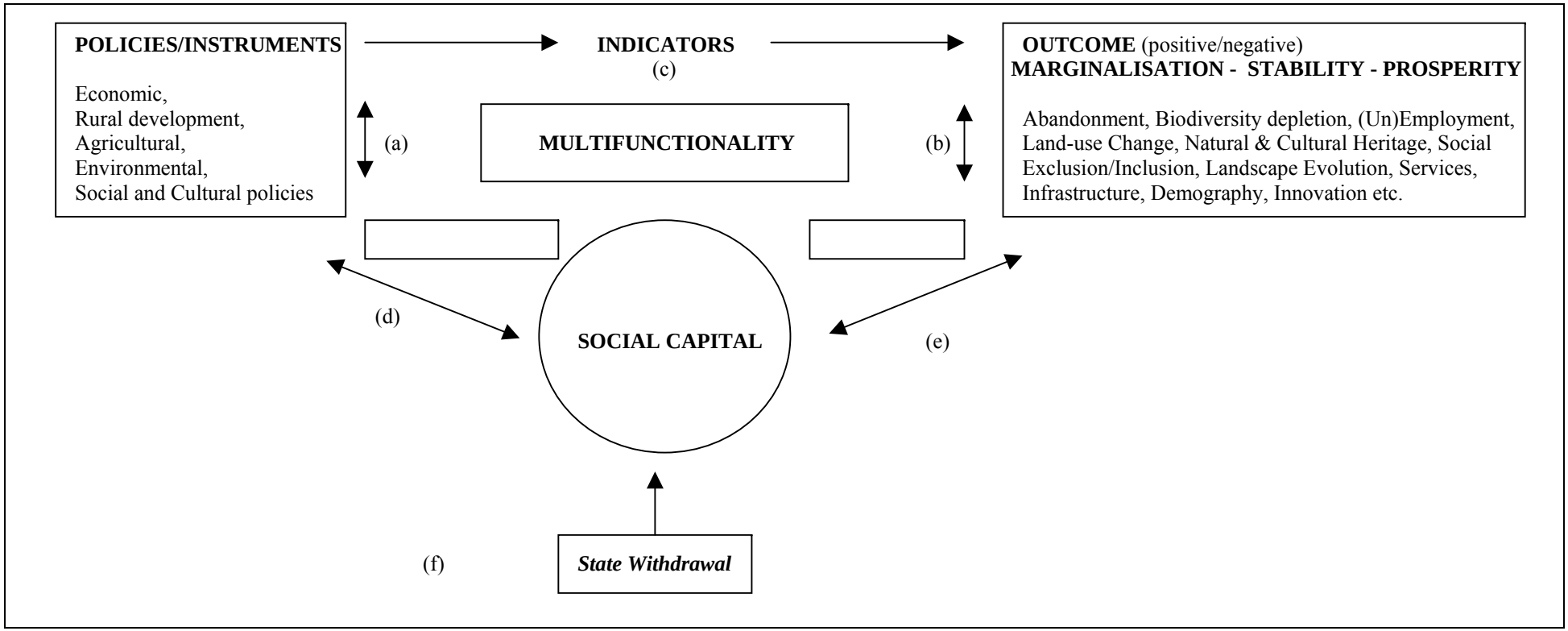
Figure 4.1 explains the role of social capital in rural development and combating marginalisation by concretising and discussing the above considerations. The scheme only refers to the local level, i.e. to local communities, not taking into account the numerous supra-regional issues and interdependencies with the outside world, such as global processes and general politics which do not explicitly focus on the local area, which form the institutional environment for local decision making.

Policy measures (a) include every sort of policies such as agricultural, environmental, rural development, economic, social and cultural policies. Instruments are the tools which are used for implementing the policy measures. Multifunctionality[1] generally implies consequences of an economic activity to the local, regional and supra-regional systems, which are other than the intended product and which often have a public good character, such as the maintenance of rural cultural landscapes, the prevention of depopulation in remote areas and the development of balanced and viable rural areas. The implementation or non implementation of policies and even more their aims and effectiveness may result in marginalisation (b), but also in the opposite as "non-marginalisation", i.e. stability (indicating a steady situation), or even positive changes and prosperity in terms of growth or improvement.

A traditional approach for studying policy impacts is to analyse statistical quantitative indicators defining certain thresholds for marginalisation (c). However, data drawn from various databases may explain largely but not entirely the correlation between the whole range of driving forces and the outcome in a given region. Social capital could act as the missing link in the chain, helping to understand why certain policy measures are successful in some areas whereas in others fail, and why areas with approximately similar physical and economic conditions perform so differently.

[1] Behind multifunctionality is the idea that agriculture, in addition to producing food and fibre, produces a range of other non-commodity outputs, such as environmental and rural amenities and food security, and contributes to rural viability (OECD, 2005).

Figure 4.1: Conceptualising Social Capital, Rural Development and Marginalisation
Source: Wiesinger, G., Vihinen, H., Tapio-Bistrom, M.L. and Fagarazzi, L., 2005.



At least four possible scenarios can be identified (see Table 4.1):

- a proper set of policies according to economic theory (+) might either improve the situation (+) or not (-);
- a non-existing or improper set of policies (-) might incite marginalisation (-) or, despite every expectation, the situation might even improve (+).

Since the correlation (+) to (+) and (-) to (-) seems to be logical, we want to draw our attention to the anomalous relations between (+) and (-): it is here that the question whether and to what extent social capital could explain these anomalies has to be posed.

Proper (+) or improper (-) policies	+	+	-	-
Amelioration (+) or worsening (-) as regards marginalisation	+	-	+	-

Table 4.1 – Links between policies and marginalisation: the possible scenarios

Social capital is not a static feature but a dynamic concept: social capital defined as associations, social networks, horizontal solidarity and reciprocity, trust and civicness (Putnam, 1993) may indeed foster the implementation of policies. The space between policies and social capital can be defined as the field of local or regional *governance* (d).

The discussion on the importance of regional governance has become quite prominent on account of the increasing weight of the regions in globalisation. Regional governance involves the role of civic community, i.e. the relationship between local actors, civil communities and policies. Since social capital is immanent with the people and formed by people living in a territory, the way in which people perceive their own socio-economic, cultural and environmental context seems to be a crucial issue.

Indeed, the perception of different people of the same phenomenon varies. This is often related to age, gender, professional background, education and life experience. In particular, people brought up or living permanently in the region and those who are incomers may have extremely different positions. This is also true to part time dwellers like summer cottage owners, short-time visitors and tourists, who influence the attitudes of local people.

Similarly, we could also expect an impact from the outcome on social capital: abandonment, landscape and land use changes, economic and socio-cultural marginalisation may cause a weakening of social capital, as well as wealth and prosperity might facilitate the creation of social capital. On the contrary, it might happen that a wealthy and prosperous context leads to the disruption of the traditional social structure, without creating a new one, while an area which is

marginal according to the main economic and social flows can still hold a viable social capital, although threatened by exodus of most active, mainly young people. The space between social capital and the outcome can be defined as the field of "perception" (e).

In the current neo-liberal discourse the concept of social capital is sometimes argued as a remedy to strengthen local cohesion while simultaneously the net of public infrastructure and administrative institutions is cut down in rural regions (f). While the state withdraws, social capital is perceived as a substitute for services formerly provided by the public. Yet, state withdrawal can even destroy social capital, particularly if combined with negative developments in the local economy, by placing too heavy demands on people's solidarity and the maintenance of social safety-nets, which are too demanding and beyond the capacity of the remaining local inhabitants.

Three prototypes of regions (Region A, B and C) can thus be exemplified according to the distribution and availability of social capital:

- *Region A: Marginal remote rural region* - These regions are characterised by little economic, cultural and intellectual capital (poor education level, brain drain, high unemployment, overaging and out-migration), while holding a strong social capital (presence of associations, mutual trust, neighbourhood, strong norms).

- *Region B: Commuter region* - These are less remote and economically marginalised region; the economic, cultural and intellectual capital is higher than in Region A, but social capital is lower. Since the accessibility is better than in Region A most of the people commute and thus spend just little time for civic engagement in their community. This situation might either lead to better conditions for agriculture and lower rates of abandonment or – on the contrary – to a more marked abandonment and afforestation trend due to a higher level of industrialisation or a well developed tertiary sector, which often go hand in hand with farmland abandonment.

- *Region C: Peri-urban region* - These regions are plenty of urban incomers and day commuters who are just little interested in the affairs of the local community. The economic, cultural and intellectual capital is much higher than in Region A and in Region B, while the amount of social capital is very low. The decline of social capital is mainly not due to the fact that local people commute like in Region B but that a huge number of urban incomers change the social network. People brought up in the community and incomers live in separate worlds (Burnett, 1998).

Regions B and C are characterised by a shortage of local associations, trust and cultural life, whereas in Region A community life is lubricated by social capital despite cultural and economic marginalisation. Even though in terms of social marginalisation Region A is better off than Regions B and C, this situation is only temporary and not sustainable, since the lack of economic dynamism and employment opportunities forces young and most active people to emigrate.

When trying to answer the questions posed at the beginning of this Paragraph, we can suggest that social capital and civic engagement are important issues for successful rural development in democratic societies, since democratic processes necessitate certain amount of engagement, trust and mutual cooperation. Hierarchic, top-down mechanisms could also take over the function of combating marginalisation, but not in a sustainable and democratic manner. Social capital is thus a precious asset: a "connected society" that is rich of social capital may promote rural development more easily. Social capital facilitates the utilisation of local resources, both in terms of natural and human resources, via the creation of social networks, trust and civicness.

Yet, global socio-economic transformations are having an important effect. In the era of globalisation rural areas and their populations are subject to vast transformation with a strong impact on the whole fabric of local communities. Many processes and forces are detrimental to civic engagement: people have less time and leisure for voluntary associations. As television, telecommunication and the Internet produce a virtual neighbourhood, people do not necessarily need to link each other to gain all sufficient goods, entertainment and information. By loss of local infrastructure, the closing down of local shops and bars, gathering places are getting also sparse and thus opportunities for contact have decreased.

Commuting also brings about a spatial fragmentation between home and workplace, which in the long run might be bad for local voluntary associations and community life. But at the same time commuting may even foster the bridging of social capital: people working outside their region are exposed to a wider array of social and community networks facilitating new and ample experiences, so that through them innovations and new ideas from outside may also come more easily into rural regions.

Hence, social capital should not be considered as a constant and stable feature. On the contrary, the structure of social capital has to adapt to new challenges and developments. New collective organisations will have to emerge in response to new needs.

Yet, some government policies have almost certainly the effect of destroying social capital. For example, the closing down of railroads, post offices and public services are disrupting existing community ties. Local civic community can hardly replace or compensate the deficiencies

generated by state withdrawal. Rural development needs hardware for institutional infrastructure. On the other hand, social capital could be promoted by government actions aimed at creating institutional structures that encourage cooperation and give opportunities for learning and thus increasing trust between local actors.

Given its importance in rural development dynamics, social capital should be better recognized by policy-makers as a key-factor in determining marginalisation processes, hampering (when weak) or helping (when strong and well-rooted) the implementation of rural development policies and specifically those policy measures aimed at counteracting marginalisation processes and their consequences, such as land abandonment.

The creation and/or strengthening of social capital should actually be a conscious aim of any rural development policy.

CHAPTER 5 - STATE

As explained in the introduction (namely Paragraph 1.4.2), the state of the environment as regards the phenomenon of land abandonment in the Alps can be properly described through the analysis of three main processes: demographic changes, decline of mountain farming and forest expansion. Such a choice has not been fortuitous at all: these trends are indeed closely related to marginalisation processes and land abandonment, as well as interconnected each other (see Chapter 3). One of the main effects of geographical marginalisation is depopulation of uplands, which in turn causes land abandonment. On the other hand, also agricultural marginalisation contributes to land abandonment, by causing the running down of the less competitive forms of agriculture and the neglect of farmland. Such a land use change from cultivated or otherwise managed land to abandoned territories gives rise to extensive land cover changes, namely the invasion of shrubs and trees into farmland and, after all, a process of natural succession, which finally results in forest expansion.

For all these reasons demographic trends, decline of mountain farming and forest expansion have been considered as being particularly representative of the state of the environment as regards the phenomenon of land abandonment in the Alps. In particular, one of the main factors directly leading to spontaneous afforestation and the process of "*re-wilding*"[1] of mountain farmlands is the running down of extensive zootechnical activities and the consequent decline of traditional mowing and grazing practices and abandonment of alpine pastures, wide extensions of which have turned to forests in the last decades.

On the other hand, other issues which are commonly associated with typical mountain problems, such as tourism development, local and transboundary transports and exploitation of hydroelectric power, have not been considered in this chapter, while being just marginally treated throughout the thesis, i.e. as far as they are connected with marginalisation and land abandonment.

[1] By "re-wilding" is meant a process in which a formerly cultivated landscape develops without human control (Höchtl *et al.*, 2004).

5.1 – Demographic trends

Demographic trends in the Alps vary widely between different regions and even within a single valley. While several countries and regions are characterised by population growth, the general statistics often hide highly contrasting situations, where urban-like settlements in the valley floors continue to expand, while smaller settlements at higher altitude are facing strong depopulation. The driving forces leading to such a phenomenon have been analysed in Chapter 3 and particularly in paragraph 3.2.1; in this Chapter the current state of the art will be described.

The studies by Werner Bätzing, the main expert of demographic trends in the Alps, show a slight population increase coupled with a marked ageing trend throughout the Alps. As the birth rate is even higher than in many parts of Europe, e.g. Italy, the overall positive demographic trend masks particular situations where out-migration is still heavy.

To give an example, between 1881 and 2000 population more than doubled in 56% of Alpine municipalities, while at the same time it decreased by 25% or even 50% in the rest of them (CIPRA International, 2004). During this lapse of time, three different shorter periods can be distinguished (see Figures 5.1, 5.2 and 5.3).

Overall, during the 19th century and the first half of the 20th, population generally increased in the Alps, although at a lower rate than in the rest of Europe, where the development of an industrial society was characterised by a strong population growth. Such a positive trend increased even more after World War II, i.e. during the transitional phase from an industrial to a service economy, to the point that since 1970 population growth for the Alps as a whole has been being significantly above the European average (Bätzing, 2000).

Yet, population growth has always been unevenly distributed, both at regional and local level: at a time when western eastern Alps were characterised by a demographic boost – a trend which already started in the 19th century and it is still going on, although to a more limited extent, – south-western and south-eastern Alps were affected by a dramatic population decline.

Moreover, population in the growth regions is not increasing over whole areas, but almost exclusively in the easily accessible settlements in the main valley floors, whereas the population in the neighbouring remote side valleys or in the less accessible villages, hamlets and single farms remains relatively unaffected or decreases even, although located within the same municipality.

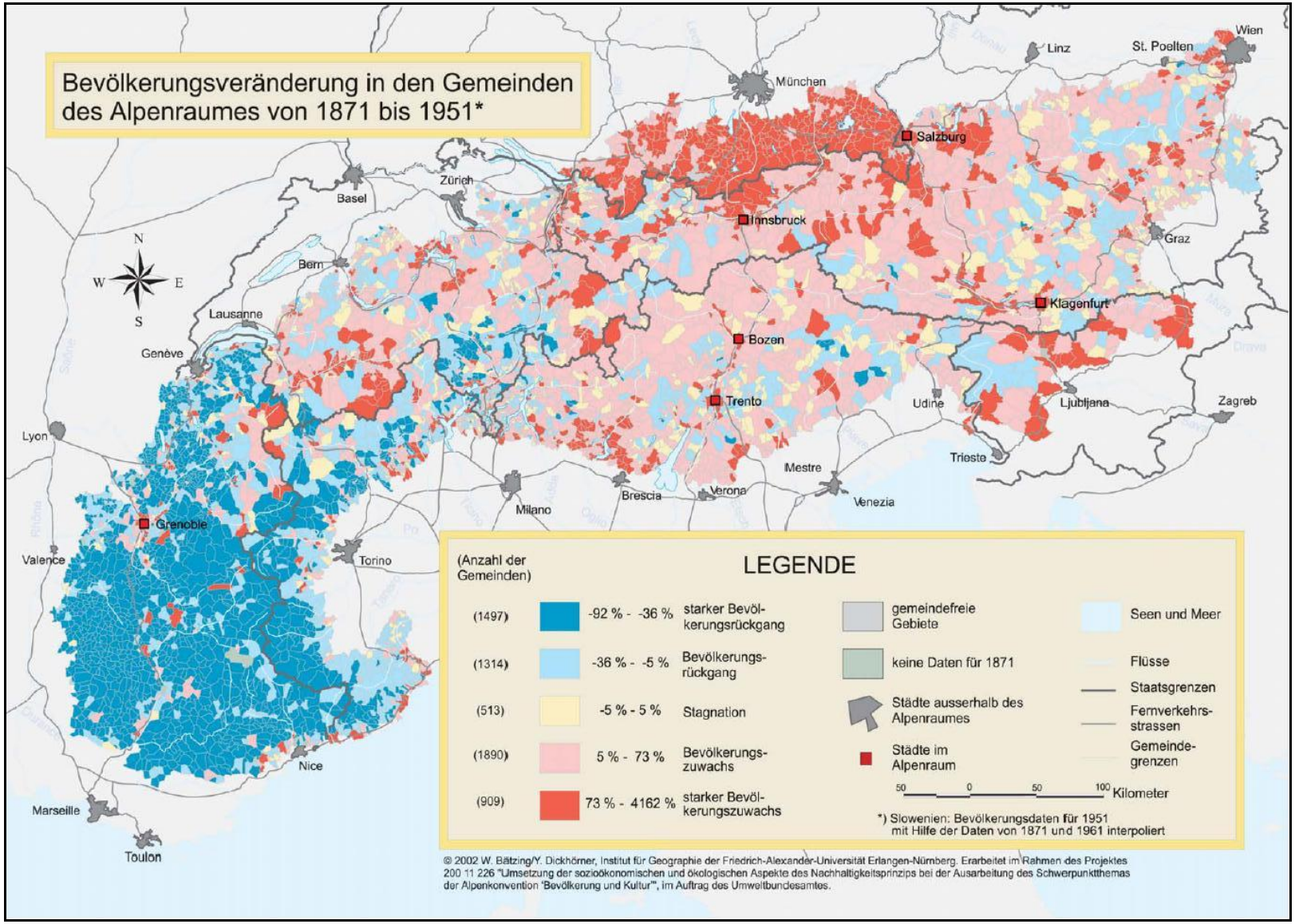


Figure 5.1– Population changes in Alpine municipalities between 1871 and 1951. Source: Bätzing, 2002

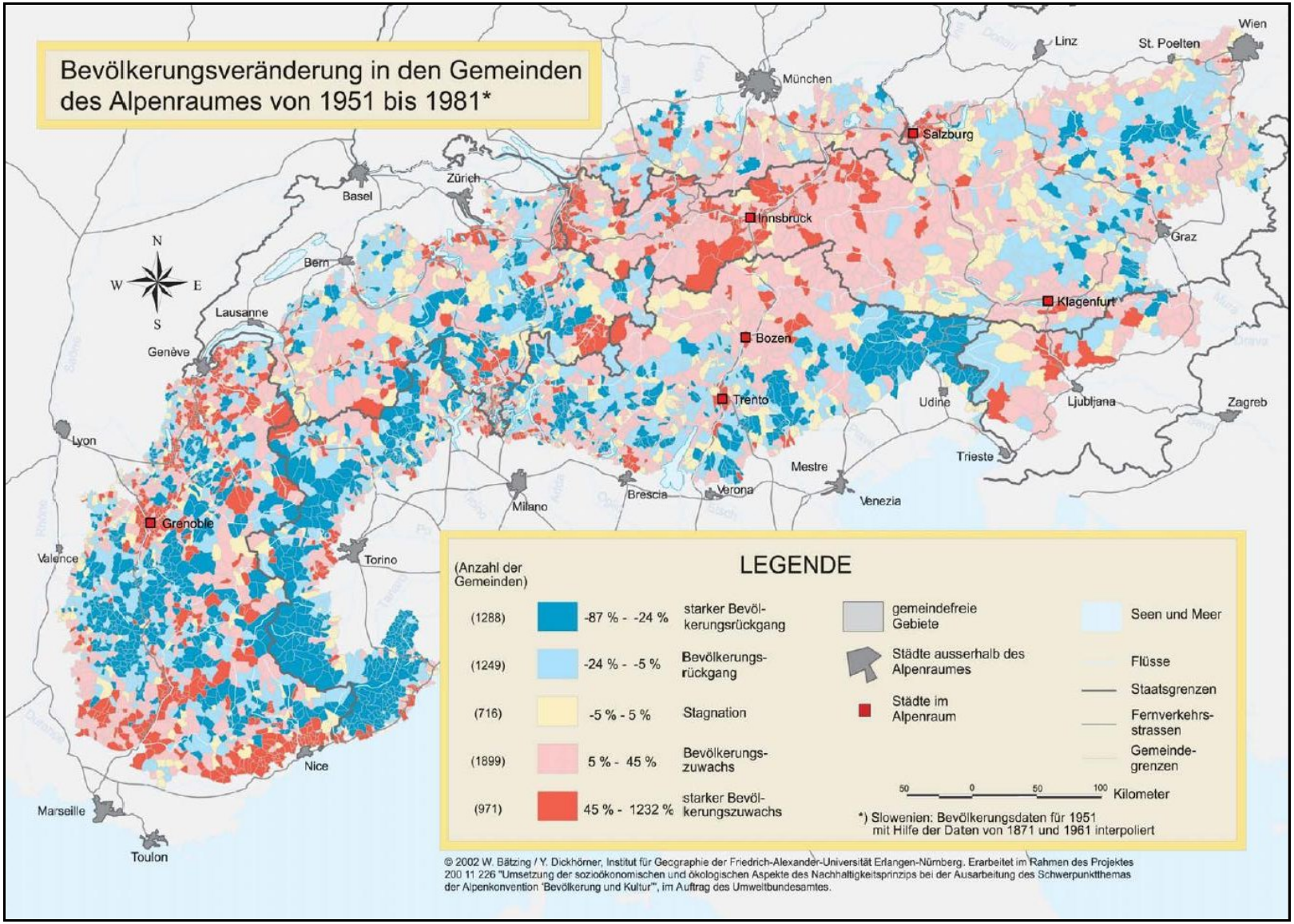


Figure 5.2 – Population changes in Alpine municipalities between 1951 and 1981. Source: Bätzing, 2002

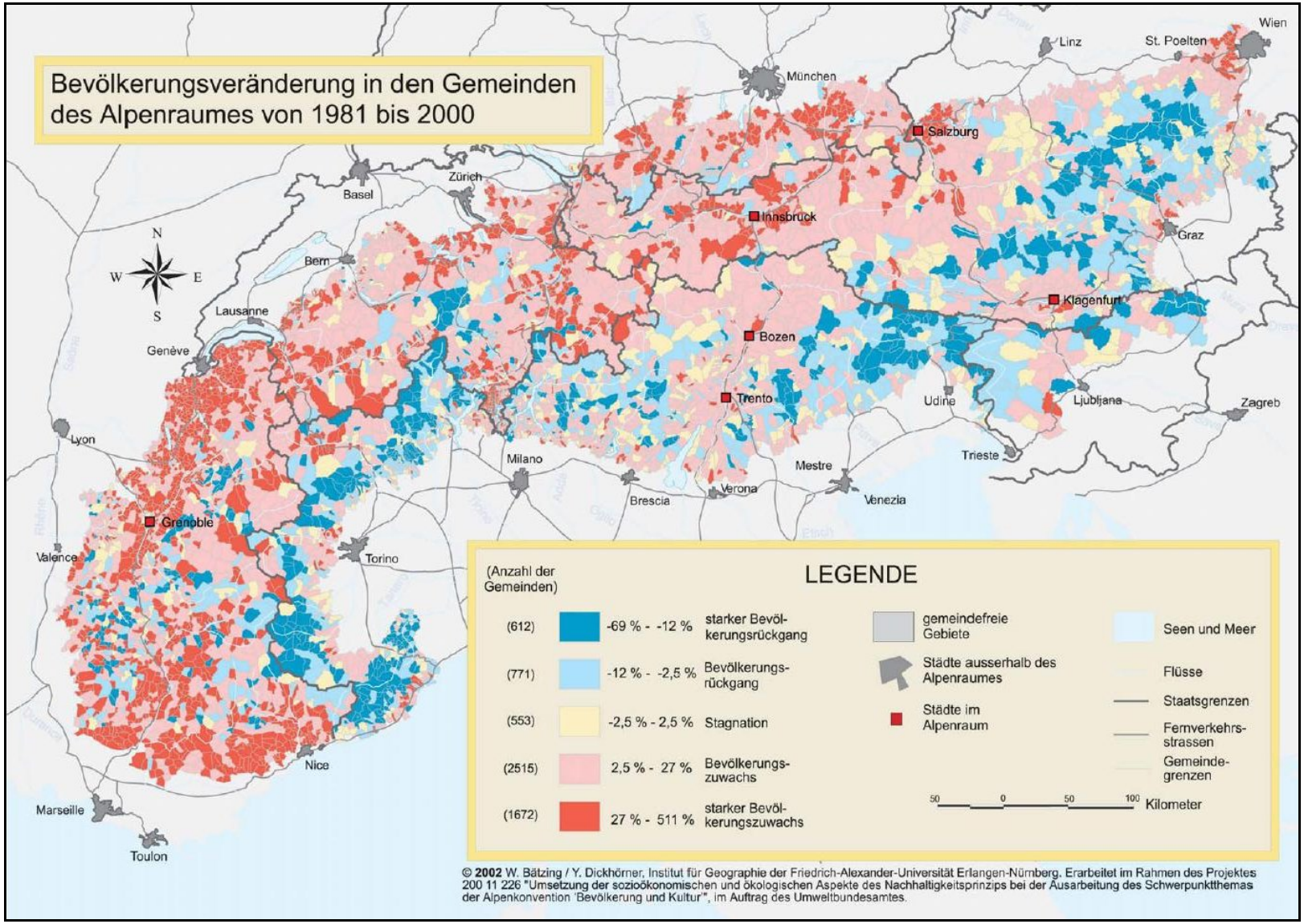


Figure 5.3 – Population changes in Alpine municipalities between 1981 and 2000. Source: Bätzing, 2002

On the other hand, in the areas affected by declining populations the remaining population becomes more and more concentrated on the most accessible valley locations, while the remoter side valleys are becoming more and more deserted (Bätzing, 2000). This phenomenon has been referred to as "the Alps between urbanisation and desertion" (*ib.*) as well as "polarisation" (Favry, 2004), a term largely utilised within the European funded project REGALP (see Paragraph 3.2.1), which found out that the prosperous central areas, i.e. the Alpine cities and their suburbs mostly located in the valley floors, contain 57% of the Alpine population and 71% of the working places, while covering only 23% of the total surface (*ib.*).

This process is reflected by the uneven distribution of population density, which is mostly concentrated in the main inner valleys and along the edges of the massif, at lower altitudes (see Figure 5.4). Indeed, in 1990 93% of population concentrated below 1,000 m above sea level, and even 53% lived below 500 m above sea level (Bätzing, 1997, in EEA, 1999a).

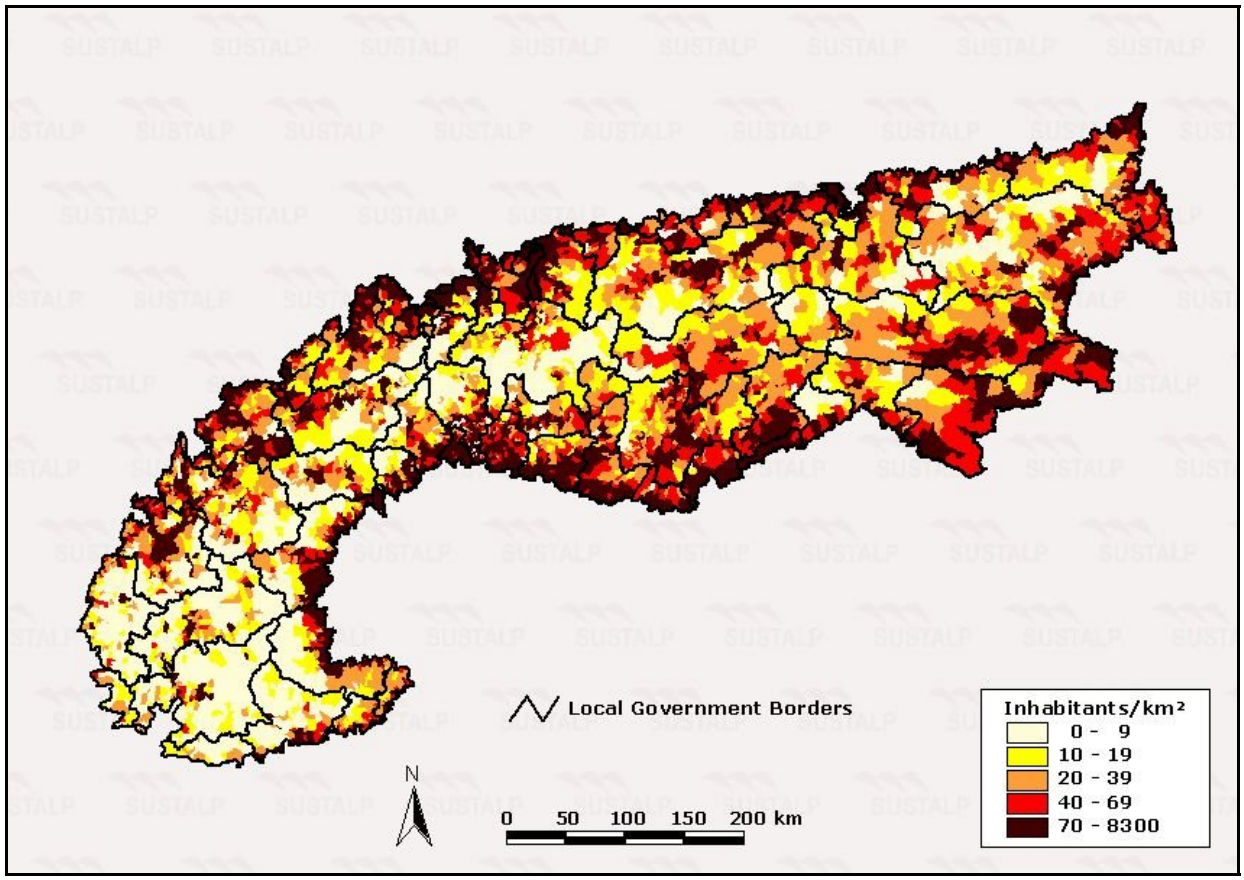
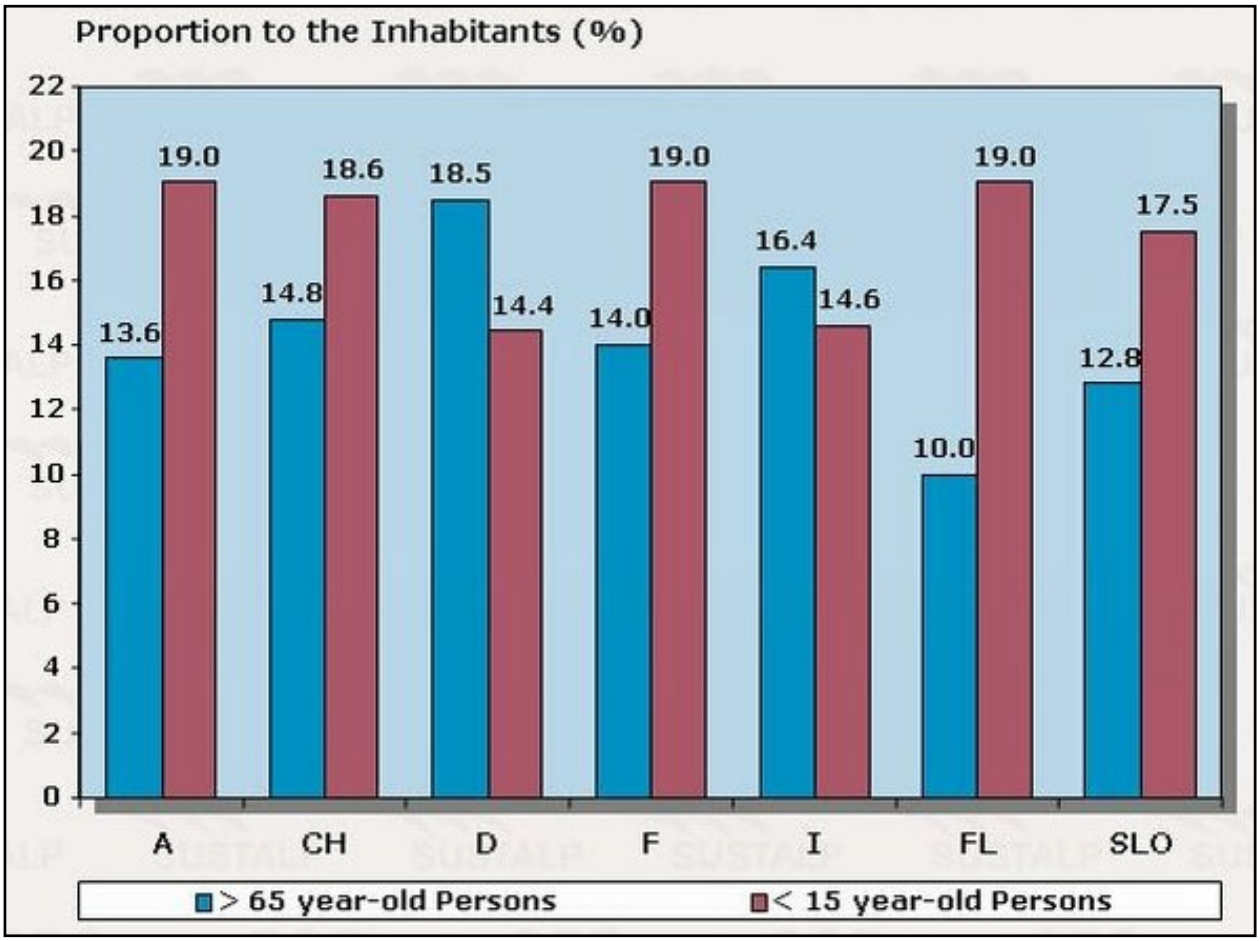


Figure 5.4 – Population density in the Alpine regions. Year of reference: 1990. Source: Tappeiner *et al.*, 2003b

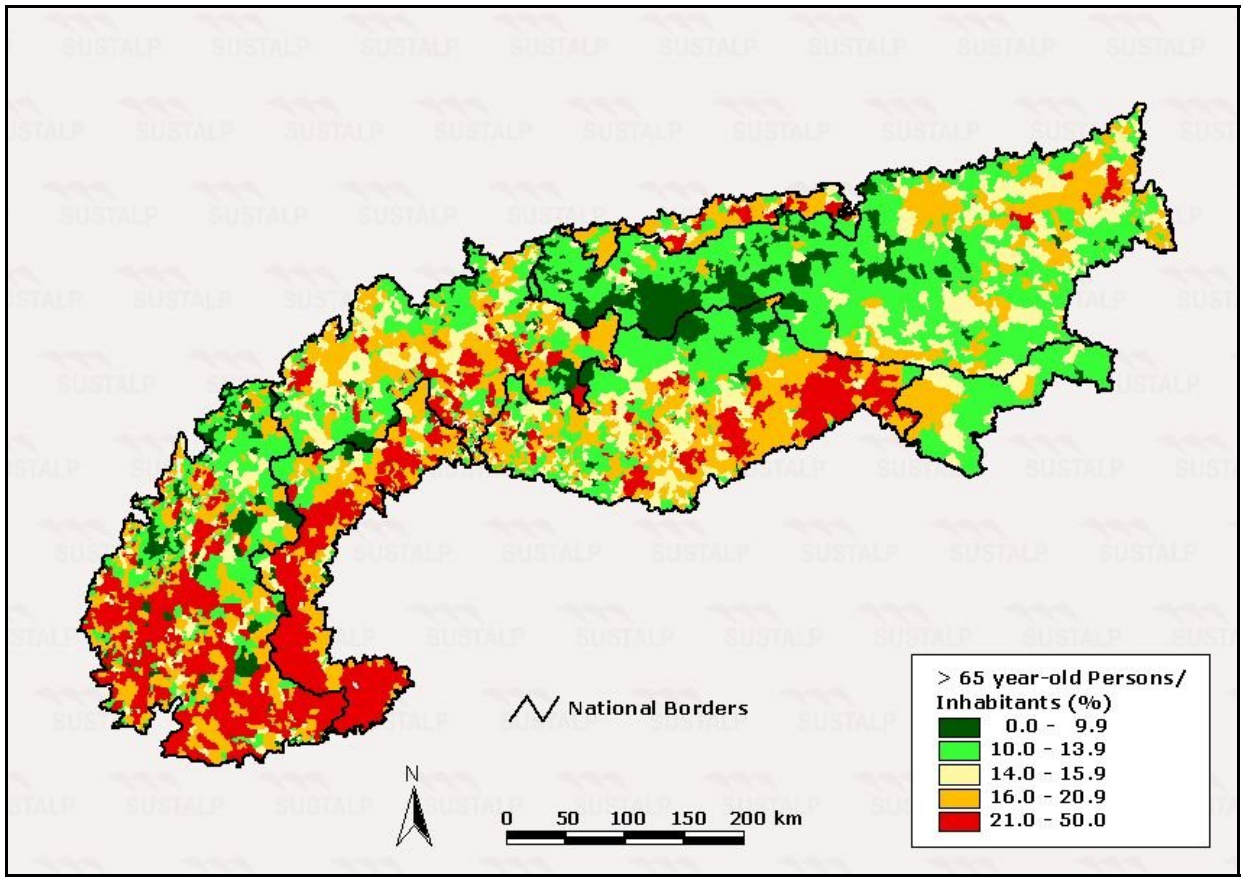
Along with depopulation, another well marked trend is ageing. Graph 5.1, together with Figures 5.5 and 5.6, show the rate of elderly people (more than 65 years old) and children (less than 15) respectively.

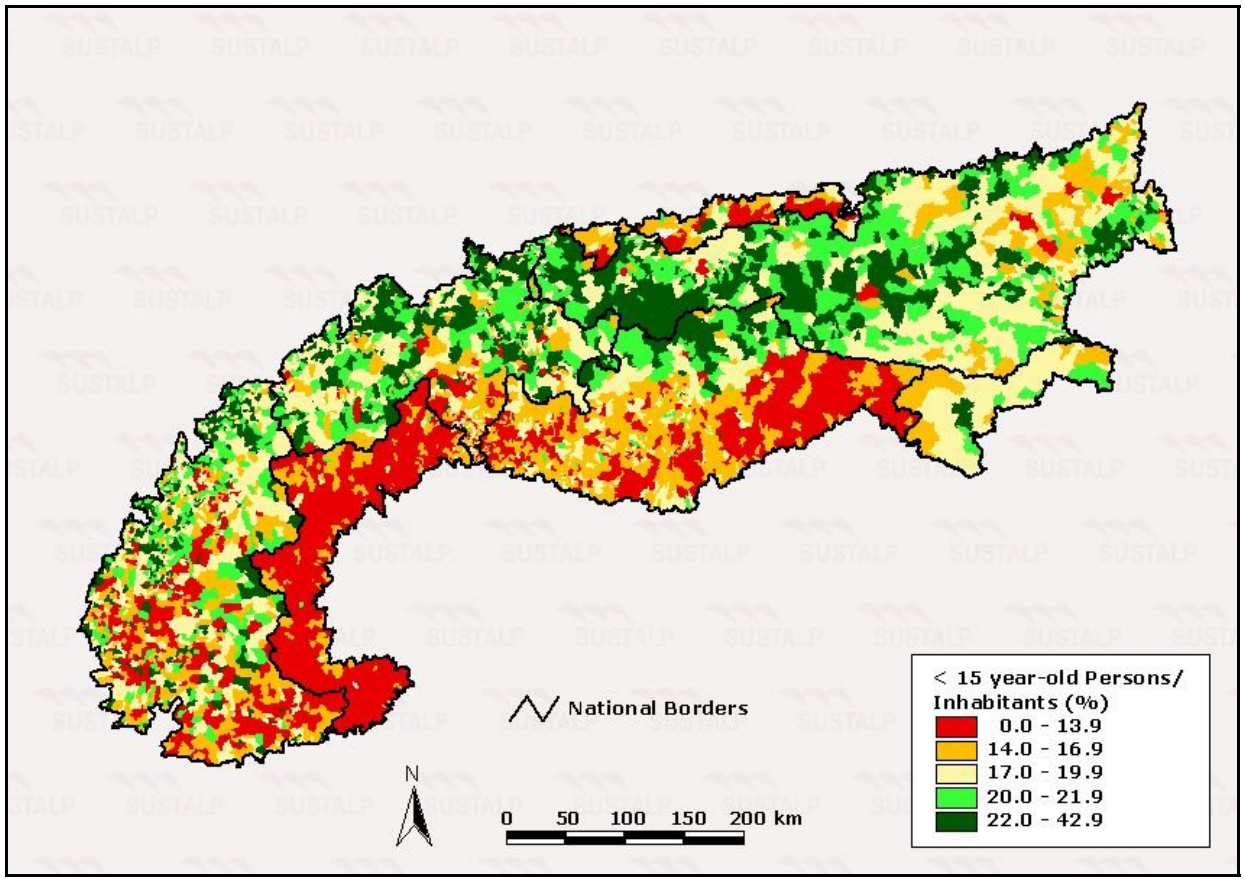


Graph 5.1 - Proportion of older people and children in the Alps. Year of reference: 1990. Source: Tappeiner *et al.*, 2003b

As regards Italy, according to the analysis explained in Paragraph 3.2.1, an initial period of strong depopulation occurred in Italian western Alpine regions as well as the bordering French Alpine areas, meanwhile population was still increasing in the overwhelming majority of the Alpine municipalities. From the Italian unification (1861) to mid twenties the demographic boom which struck Italy causing doubling of Italian population as a whole somehow affected also mountain population, which increased from about 5 million to 8.5 million inhabitants (Agnoletti, 2004), mostly concentrated in central and eastern regions.

Yet, after World War II demographic trend was inverted in eastern regions, where people started emigrating either abroad or to the main urban centres in the lowlands. To date, depopulation trend slowed down in western regions, while it is still evident in most of the Italian Alpine arch, with the significant exception of Trentino Alto-Adige, where population is still slightly increasing. While emigration flows from the uplands to the lowlands is still present, mainly concerning young, well-educated people who find occupation in the same cities where they had their university education, a more pronounced flow goes from smaller villages at higher altitude to bigger settlements in the valley floors, where commercial and industrial activities are mostly concentrated.





Figures 5.5 and 5.6 – Elderly people (above) and children (below) distribution in the Alpine regions. Year of reference: 1990. Source: Tappeiner *et al.*, 2003b

Figure 5.3 shows how Italian Alpine arch looks quite different to the other Alpine countries from a demographic point of view. While current demographic trends are positive in France, Switzerland and large areas of Austria, most of the Italian Alpine municipalities are affected by depopulation, with particular regard to eastern regions such as Veneto and Friuli-Venezia Giulia. Such a difference might be partly explained by the greater importance attached to rural areas in Germanic culture, whilst in Italy, as well as in France, urban areas have always been playing a more central role (Stone, 1992; CIPRA International, 2004). Whereas metropolitan areas surrounding Alpine space are considered to have an increasing influence on it all over the Alps, this phenomenon is most visible in large parts of the Italian Alps (Favry, 2004).

5.2 – Mountain farming

5.2.1 – Decline of farming activities in mountain areas

The European Union as a whole has seen a significant decline in the overall Utilised Agricultural Area (UAA) in the last decades. During the sixties and seventies UAA declined by 8%, whilst since the early eighties the decline in UAA has slowed down a bit. Yet, in those areas affected by physical or socio-economic obstacles to mechanisation, such as mountain areas, arable land and mixed systems continued to be abandoned on a large scale, while being replaced by extensive livestock systems, plantation forestry or natural succession (Baldock *et al.*, 1996).

In mountain areas in particular there has been a dramatic decline in the arable land, as largely self-sufficient rural societies have collapsed or contracted and abandoned subsistence cultivation; such a process is obviously more noticeable in the least developed regions, such as the remotest mountain areas, where traditional agrarian societies survived up until quite recently (*ib.*).

As mentioned in paragraph 4.1, 19 out of the 25 case studies considered within the European research project *Integration of Environmental Concerns into Mountain Farming* were found to be affected by farmland abandonment, while 2 more case studies were concerned by abandonment of traditional farming practices. As regards the Alps, in the regional network "Central and Eastern Alps" 3 out of 5 case studies suffered from land abandonment (namely the Triglav National Park in Slovenia, Val di Cembra in Trentino, Italy, and the Swiss Canton D'Appenzell), as well as all of the 5 case studies located in the regional network "Western Alps" (MacDonald *et al.*, 2000).

Concerning the Alps as a whole, the data show a decrease in UAA by 4.8% from 1980 to 1990, so that in 1990 UAA covered 13% of the total Alpine territory. Similarly, also the number of Livestock Units is facing a negative trend, since this indicator decreased by 8.9% during the same time period (Tappeiner *et al.*, 2003a).

These negative trends are somehow related to farm abandonment, although this datum needs to be interpreted independently. As a matter of fact, farm abandonment factor representing the variation in the decade from 1980 to 1990 has a value of –14.9% (*ib.*). Nevertheless, a high rate of farm abandonment does not necessarily mean a high rate of farmland abandonment, while it might be evidence of merging of many smaller farms into a more limited number of bigger farms, a process which often – although not automatically – brings about intensification and a shift towards full-time farming.

However, average data are not particularly significant when talking about the Alps, since the variety of physical and economic situations is extremely high. Analyses at regional or even local level are thus much more significant.

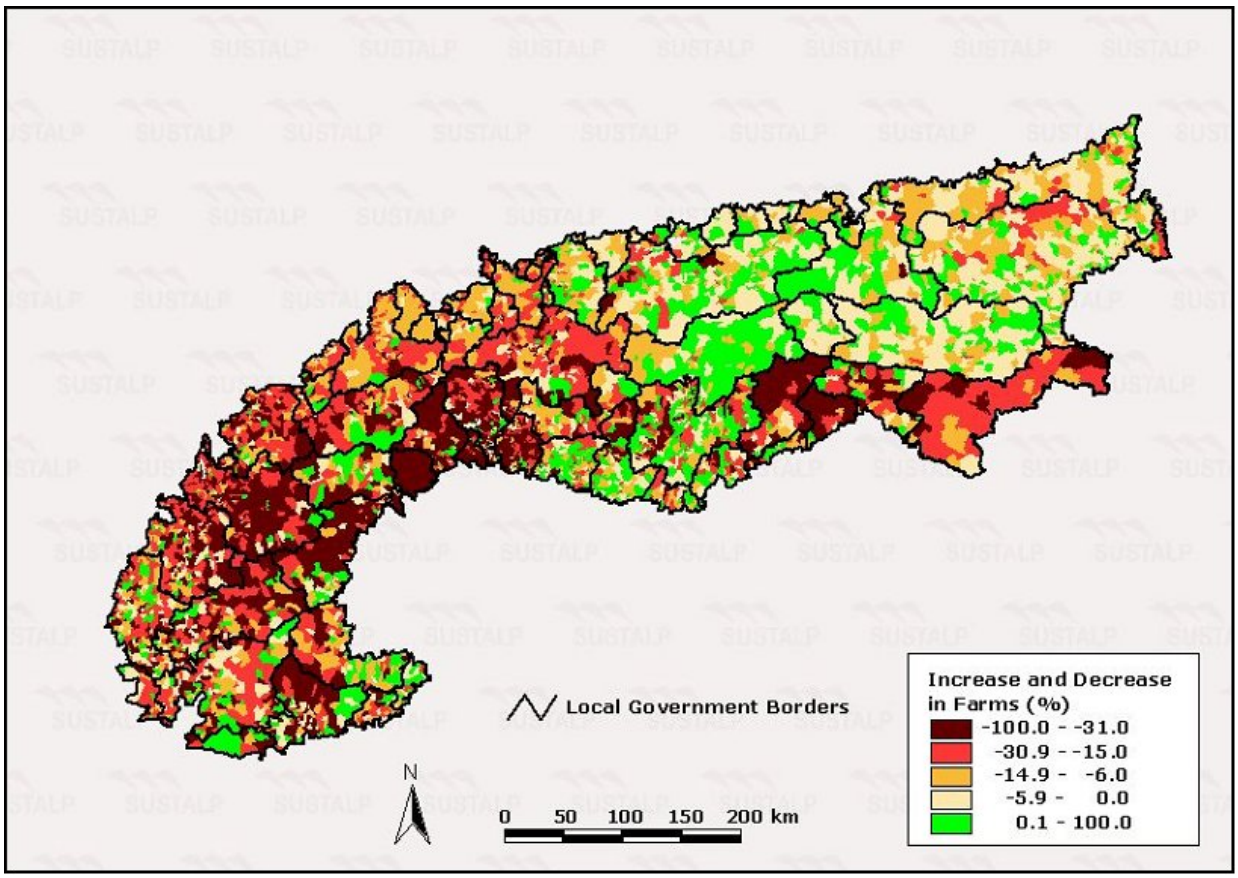


Figure 5.7 – Change in the number of Alpine farms between 1979 and 1997. Source: Tappeiner *et al.*, 2003b

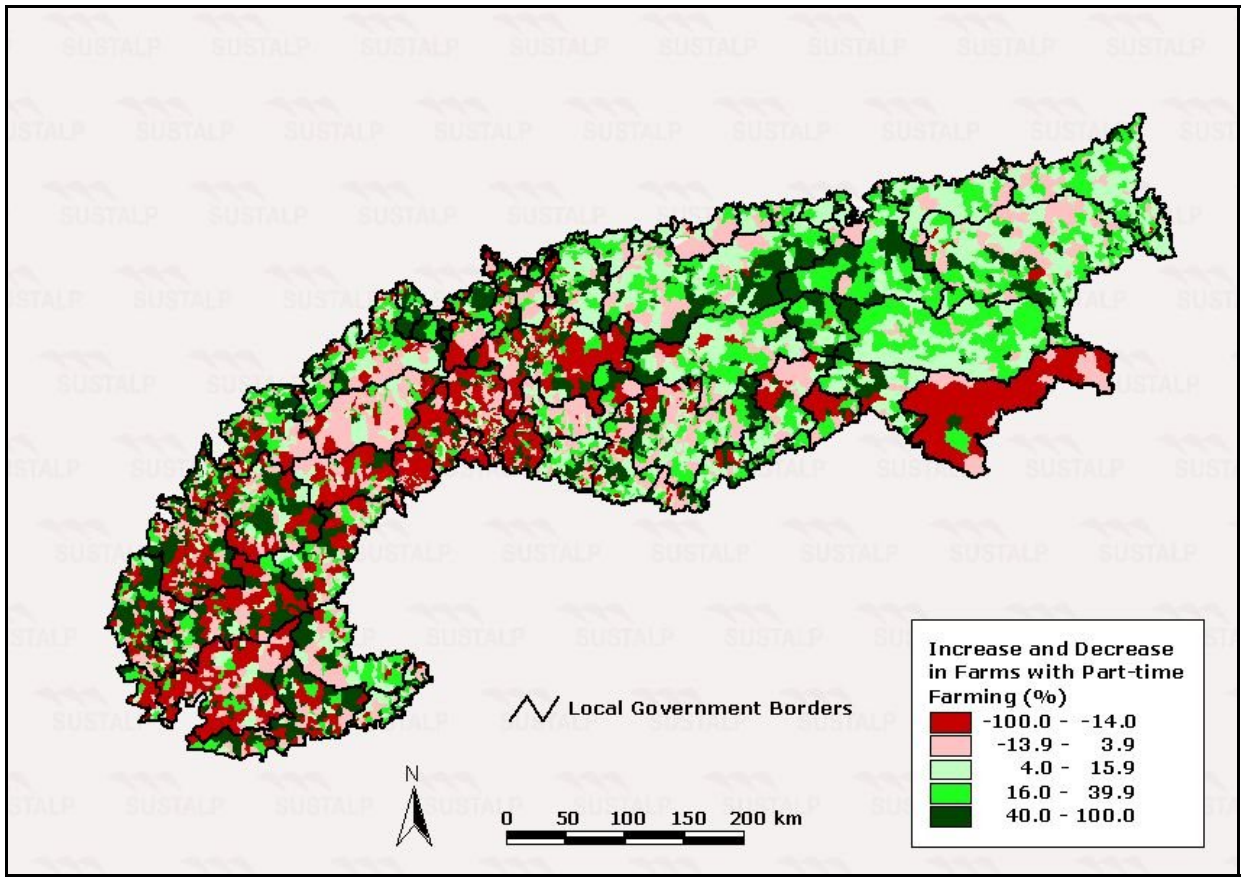


Figure 5.8 - Change in the number of Alpine farms with part-time farming between 1979 and 1997. Source: Tappeiner *et al.*, 2003b

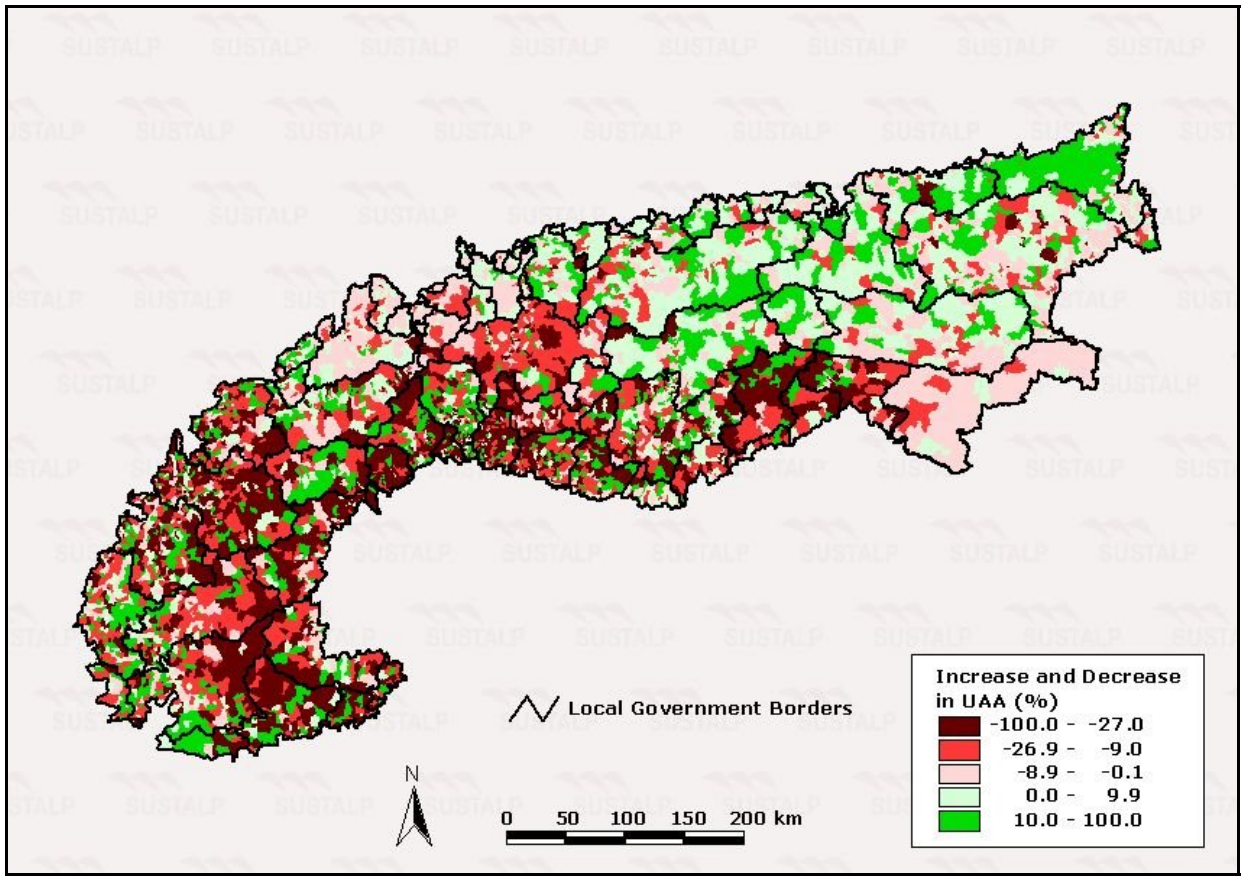
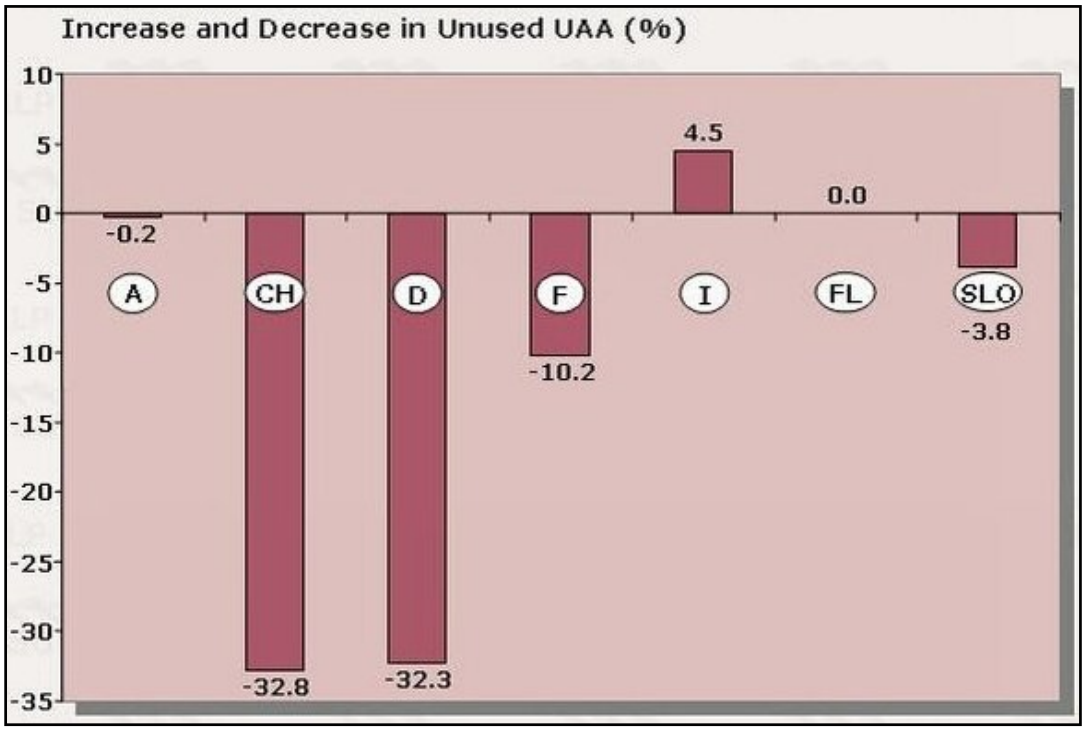


Figure 5.9 – Change in the UAA extension in the Alps between 1979 and 1997. Source:Tappeiner *et al.*, 2003b

Figures 5.7 and 5.9 show the local trends as regards the number of farms and the UAA extension respectively. One might notice that in some areas decrease in farms corresponds to decrease in UAA, although this only happens to some extent. In most of the Italian Alpine regions declining number of farms and decreasing UAA are coupled, while in western Austria a slight increase in the number of farms as well as in the UAA are occurring at the same time.

The trend referring to the number of farms as a whole is quite similar to the trend associated with part-time farming only (see Figure 5.8). In both cases the trend is negative in western Alpine areas, while it is generally positive in the eastern regions. Significative exceptions among the latter group of regions are Veneto and Friuli-Venezia Giulia, which, together with Slovenia, are characterised by a strong decrease in the number of farms, although Figure 5.8 shows a slight increase in part-time farming in the two Italian regions.

The increase in the extension of unused usable agricultural area is just the other side of the decrease in Utilised Agricultural Area: the more the latter shrinks, the more the former enlarges. The peculiarity of Italian situation within the Alpine context clearly appears from Graph 5.2. While in the other Alpine countries the unused agricultural area has decreased (which means that a larger area is reversed back to cultivation in comparison with the area which is abandoned), this trend is opposite in Italy, where unused agricultural area is increasing. The distribution of unused usable agricultural area is shown by Figure 5.10. Once again the widespread distribution throughout Italian Alpine regions, with the exception of South Tyrol, can be noticed.



Graph 5.2 – Change in unused usable agricultural area between 1979 and 1997. Source: Tappeiner *et al.*, 2003b

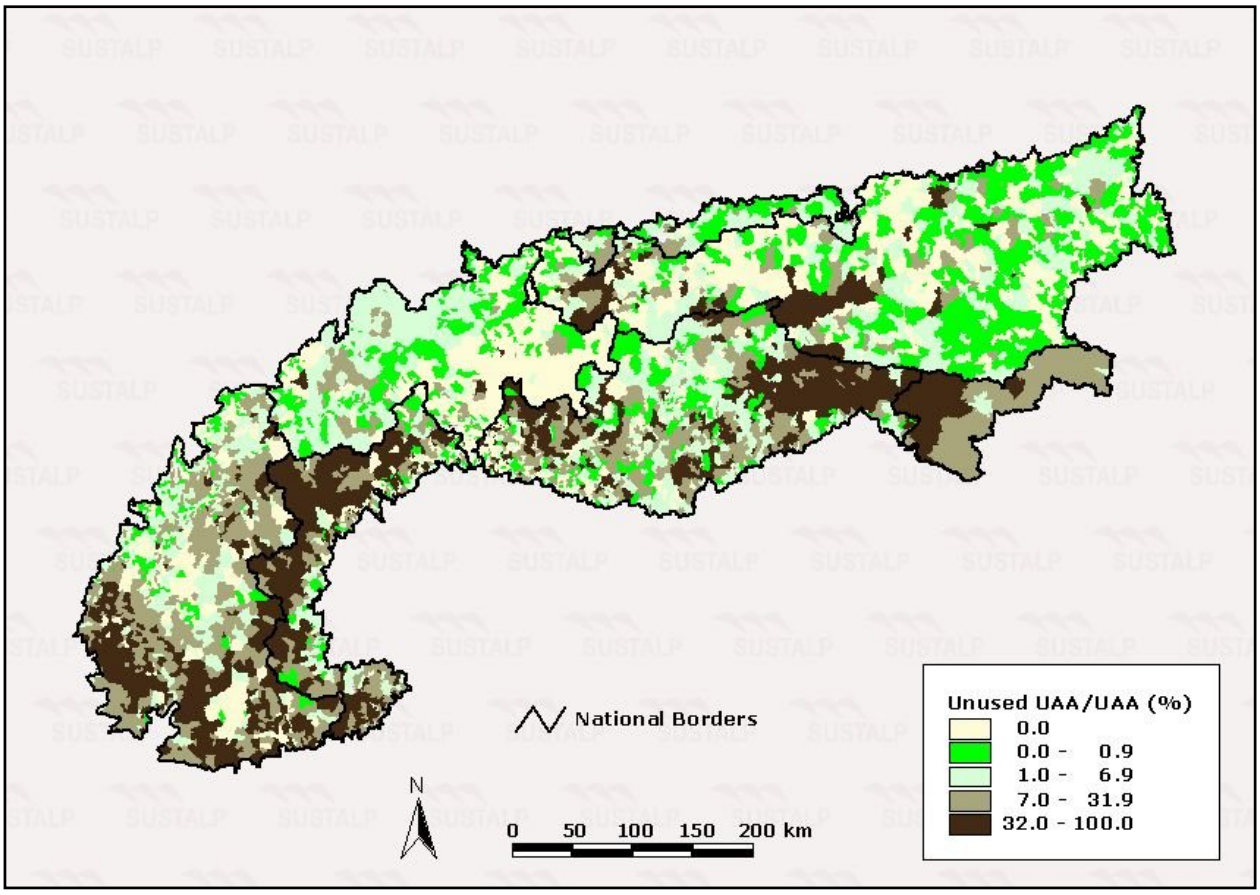
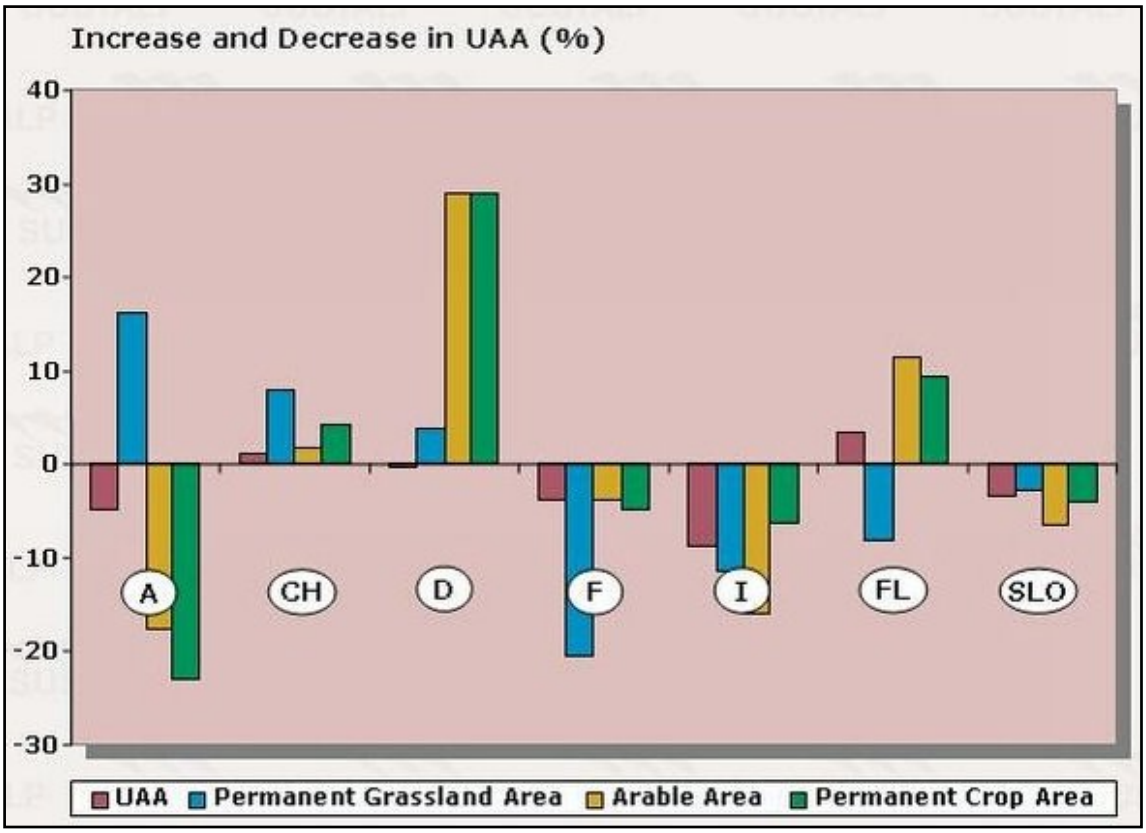


Figure 5.10 – Distribution of unused usable agricultural area in the Alps at the beginning of the nineties (data ranging from 1988 to 1996). Source: Tappeiner *et al.*, 2003b

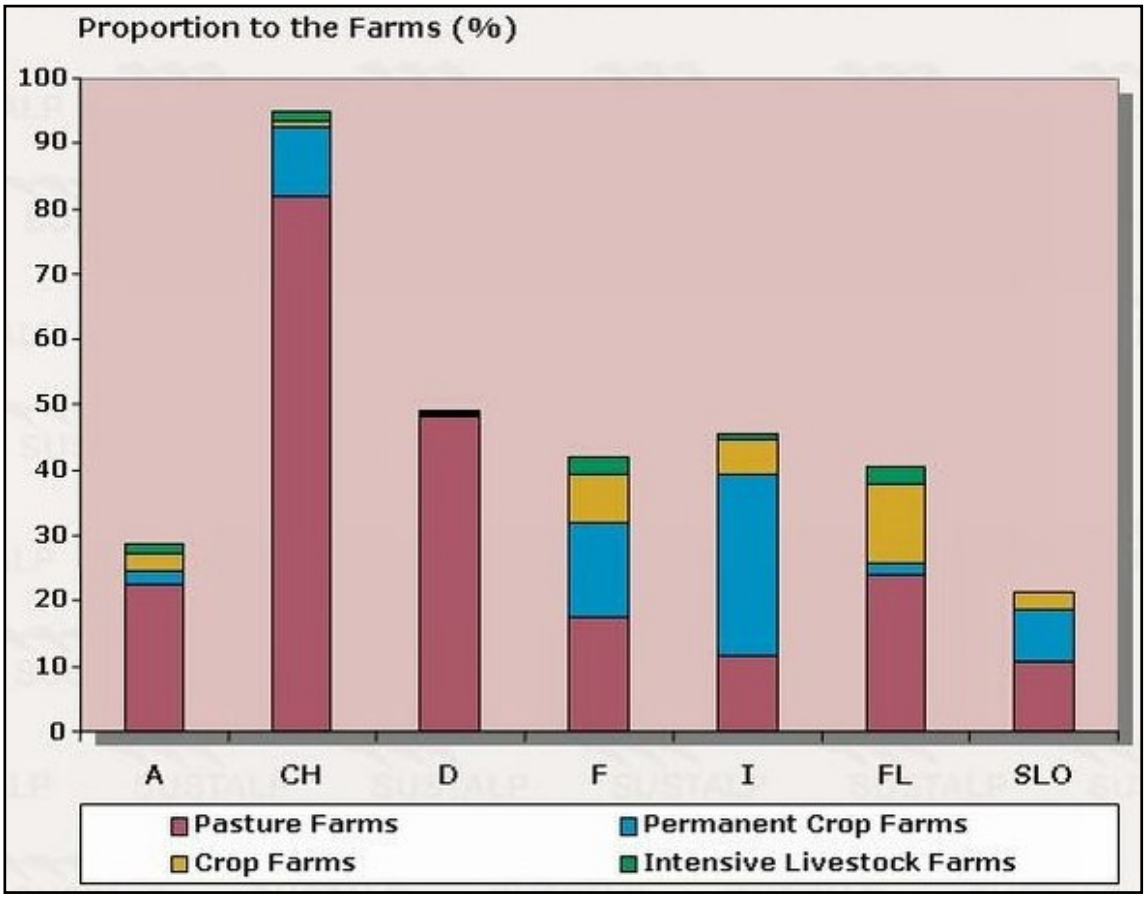
While Figures 5.9 and 5. 10 refer to UAA as a whole, i.e. without any distinction among the different land uses, Graph 5.3 disentangles the previous data, showing the changes in UAA for three different land use typologies, beyond the changes in UAA itself, for each Alpine country.

In particular, a comparison between the data related to Italy and Austria might be interesting: indeed, UAA as a whole is decreasing in both countries, but data related to the different land uses are notably dissimilar. While arable land decreases in both countries to the same extent, opposite is the situation as regards permanent grassland, which is diminishing in Italy whereas it is dramatically increasing in Austria.

Such a difference is also reflected by data related to pasture farming as by Graph 5.4 and Figure 5.11, revealing the marginal role played by pasturing activities in the Italian Alpine arch, particularly in comparison with other Alpine countries such as Switzerland, Germany and Austria itself. According to some estimates, about 800,000 hectares of grassland have been abandoned since 1960 throughout the Italian Alpine arch, which means that 45% of the surface covered by pastures and meadows at that time has disappeared (Chemini and Gianelle, 1999; Bovolenta, 2004).



Graph 5.3 – Changes in UAA by land use typologies from 1979 to 1997. Source: Tappeiner *et al.*, 2003b



Graph 5.4 – Importance of pasture farming throughout the Alpine arch at the beginning of the 1990s (data ranging from 1988 to 1996). Source: Tappeiner *et al.*, 2003b

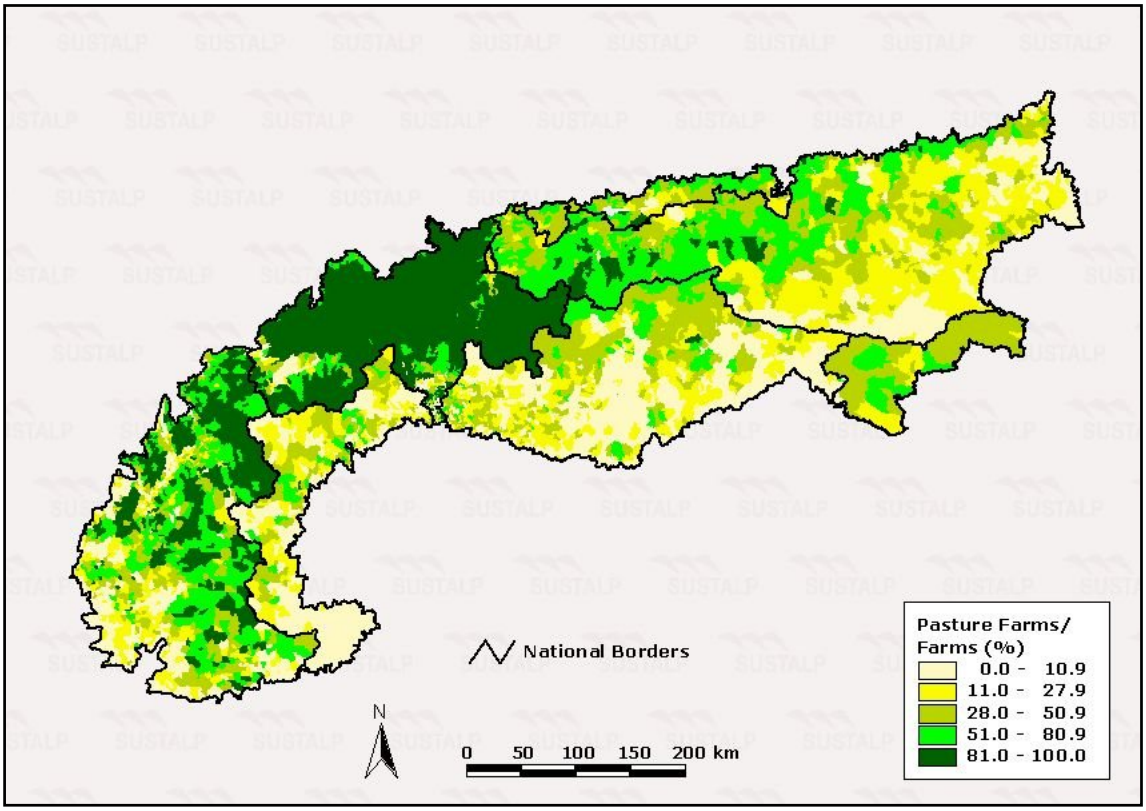
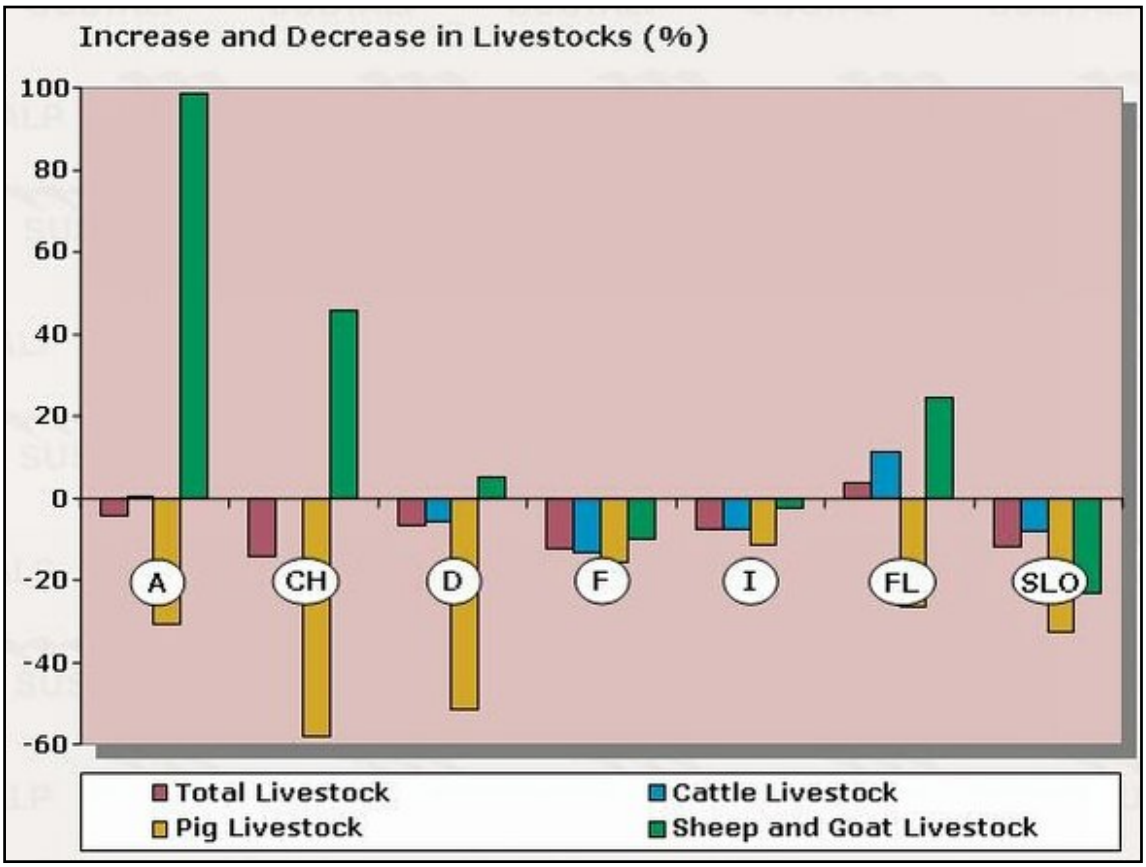


Figure 5.11 – Distribution of pasture farms in the Alpine arch at the beginning of the nineties (data ranging from 1988 to 1996). Source: Tappeiner *et al.*, 2003b



Graph 5.5 – Changes in the number of Livestock Units between 1979 and 1997. Source: Tappeiner *et al.*, 2003b

In contrast with such a relative great importance of pasturing farming and the increase in permanent grassland area shown by Graph 5.3, the total number of Livestock Units (L.U.) is decreasing almost everywhere, even though some species are more affected than others (see Graph 5.5): in particular, pig livestock has significantly decreased in all of the Alpine countries, while sheep and goat livestock has dramatically raised in those countries where cattle livestock has only slightly decreased or even remained steady, such as Austria and Switzerland. As far as Italy is concerned, all the trends are negative, no matter which kind of livestock is considered.

Some data specifically referring to Italian mountain areas are reported in Table 5.1. According to the agrarian census run in the year 2000, more than 490,000 hectares included within working mountain farms are no longer utilised: most of them are likely to be abandoned pastures.

	1990	2000	Change (%) 1990-2000
Number of farms	657,087	500,495	-23.83
Total Agricultural Area	7,744,810	6,483,683	-16.28
Utilised Agricultural Area	3,639,159	3,112,770	-14.46
Number of zootechnical farms	100,622	58,973	-41.39
Number of cattle units	1,353,765	1,089,945	-19.49

Table 5.1 – Agricultural indicators referring to Italian mountain areas as classified by the National Statistical Bureau. Source: ISTAT, 1990 and 2000 agrarian censuses

On this purpose a local example, which is quite representative of the current trends affecting Italian Alps, is given by the Veneto region: the data reported in Table 5.2 refer to this North-eastern Italian region.

	1990 census		2000 census		Change (%) 1990 - 2000	
	Farms	Cattle units	Farms	Cattle units	Farms	Cattle units
Local Action Group "Alto Bellunese"	639	3,394	294	2,202	-53.99	-33.95
Province of Belluno	2,562	27,161	1,137	20,606	-55.62	-24.13
Veneto Region (as a whole)	42,459	1,161,992	21,575	931,337	-49.19	-19.85
Italy (mountain areas)	100,622	1,353,765	58,973	1,089,945	-41.39	-19.49

Table 5.2 – Decrease in farms and cattle units in Veneto. Source: ISTAT, 1990 and 2000 agrarian censuses

While a general negative trend towards a reduction in the number of farms and cattle units is evident as regards the region as a whole, it is interesting to note that the data are even more worrying when focusing on mountain areas. Indeed, Veneto comprises lowlands, hilly and

mountain areas, highly intensive as well as traditional extensive forms of cattle breeding. Yet, when disentangling the average data referring to the whole regional territory, one might notice that the decreasing rates of both farms and cattle units are higher than the regional average as regards the Province of Belluno, the most mountainous province within Veneto, whose territory is located at various altitude, comprising high hilly, medium and high mountain areas. In particular, when focusing on the areas at the higher altitude (roughly corresponding to the Local Action Group named "Alto Bellunese"), the negative trend referring to the reduction of farms slightly decreases, while the indicator describing the decrease in cattle units dramatically increases.

This means that farm abandonment, although evident, is slightly less pronounced in mountain regions, while the decrease in the number of cattle units is by far much better marked than the average trend at regional level. Accordingly, the area covered by pastures and hay meadows decreased by 5.9% within the Province of Belluno between 1990 and 2000.

It might be interesting to correlate the previous data with demographic trends affecting the same area, as reported in Table 5.3. Along with depopulation, another major phenomenon concerns the number of houses not permanently inhabited by residents, which dramatically increased from 39,079 in 1981 up to 46,751 in 1991 and finally 48,115 in 2001 (ISTAT, 2001). Such an impressive increase is partly due to the numerous second homes built in the most renowned tourist resorts, but it is likely to be due to the abandonment of remote villages and isolated houses by local people as well.

	Population in 1991	**Population in 2001**	**Change (%) 1991-2001**	**Population (%) over 65**
Local Action Group "Alto Bellunese"	74,382	70,466	-5.26	20.72
Province of Belluno	212,085	209,033	-1.44	20.81
Veneto Region	4,379,930	4,490,586	+2.53	17.72

Table5.3 – Demographic trends in the mountainous areas of Veneto. Source: ISTAT, 1991 and 2001 general censuses

5.2.2 – The Alpine agrarian structure regions according to the SUSTALP project

Trends affecting mountain farming are closely connected with the different farming structures characterising Alpine territories. Indeed, running down of agricultural activities strongly depends on their competitiveness, which in turn is subject to the features of farming structure. A few research projects have been undertaken aiming at identifying, through a cluster

analysis, different groups of regions on the basis of the farming practices taking place in them, as well as posing them in correlation with the risk of marginalisation.

Beyond the study carried out by Brouwer in 1996, which identified extensive farming regions and small-scale farming regions as being particularly prone to marginalisation (see paragraph 4.4), also the European project SUSTALP– *Evaluation of the instruments of the European Union as regards their contribution to sustainable agriculture in the Alps*[1], tried a classification of Alpine municipalities into agrarian structure regions by means of a clustering process. As a first step researchers identified 8 different agrarian structure regions by determining a set of 43 indicators for each municipality of the Alps; as the second level, a limited number of model regions was chosen from each category as exemplification (Tappeiner *et al.*, 2003a). For this reason, the study appears to be the most complete description and analysis of the state of farming activities in the Alps to date.

The variables considered included socio-economic and natural conditions such as the ratio between the number of actual inhabitants and the resident population, the employment rate, altitude and slope, as well as data concerning agrarian structure, such as the number of farms and their size, arable land and permanent grassland extension and various information regarding livestock and farmers. The 8 agrarian structure regions thus identified are described below, while their distribution throughout the Alpine arch is shown in Figure 5.12.

- *Type 1: High labour, intensive crop region in a favourable location with a small-scale farm structure* - This agrarian structure is characterised by favourable conditions such as low altitude and mild climate, so that the areas in this category are usually suitable for intensive crops. This typology thus implies high labour intensity, while the small size (88.4% of farms have less than 5 ha) is mostly due to socio-cultural factors such as inheritance laws. This category is marked by an overall relative stability. Predominantly it can be found along the Etsch-Adige Valley and at the southern border of the French Alps.

- *Type 2: Labour-extensive arable land region in a favourable location* - This category can be found in favourable locations, but unlike the previous one this typology is extremely labour-extensive. Yet, a decline in part-time farming can be observed (-31.9% in the last decade), which testifies – together with the high percentage of farm abandonment (-22.1% in the last

[1] The project, co-funded by the European Commission within the 4th Framework Programme and co-ordinated by the European Academy of Bozen, was aimed at studying the effects of the CAP on the environment under differing social, cultural, economic and natural environmental aspects within the entire Alpine range (Tappeiner *et al.*, 2003a).

decade) and the above-average farm size (8.6 ha per farm) – a shift towards specialised, labour-extensive full-time farming. Predominantly it can be found in the French Alpine regions and in Slovenia.

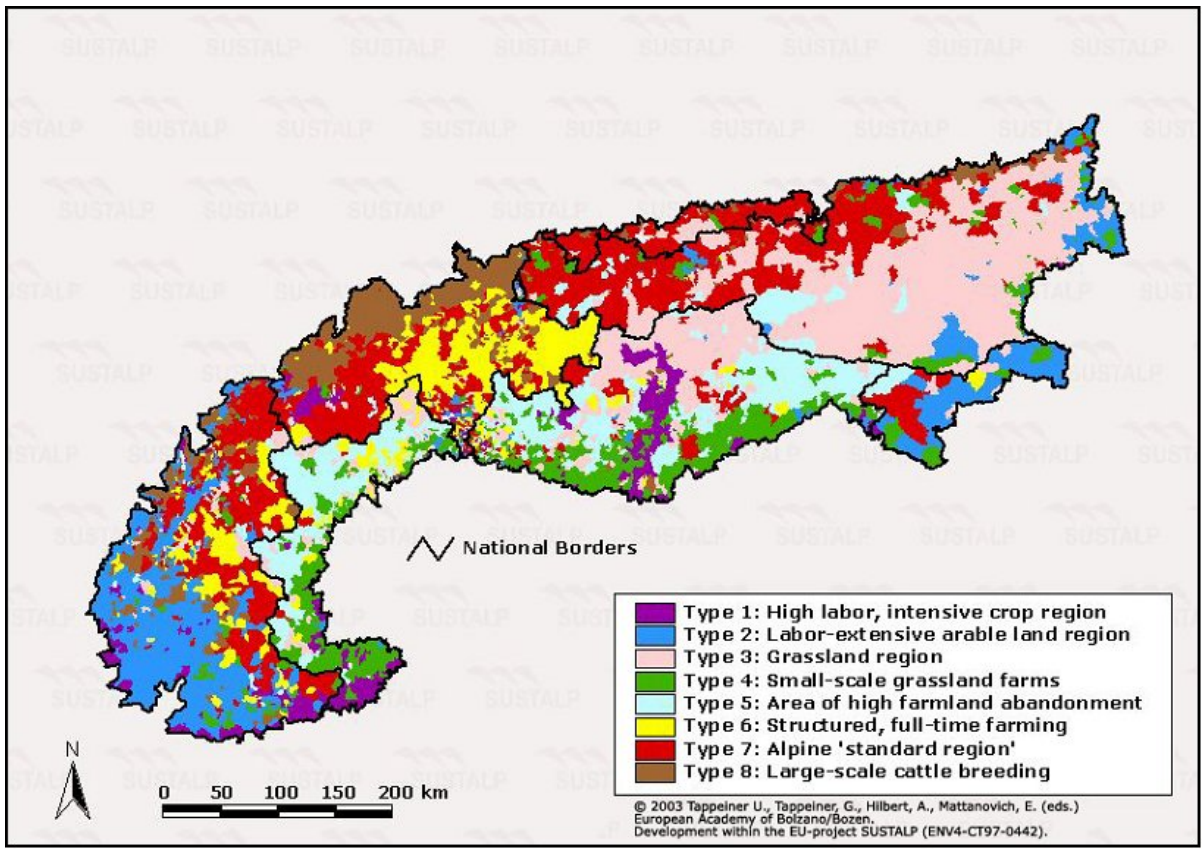


Figure 5.12 – Distribution of the 8 agrarian structure regions as identified by the European project SUSTALP. Source: Tappeiner *et al.*, 2003b

- *Type 3: Grassland region with tourism integration and balanced population movement* - This region, although strongly influenced by tourism, is not characterised by negative trends such as farm and farmland abandonment. Indeed, this typology can be considered as stable, although in transition from full-time to part-time farming. This region covers the typical core area of the Alps, and it is mostly located in the central and eastern parts of the Alps. As regards Italy, South Tyrolean mountain region is totally included within this category.

- *Type 4: Small-scale grassland farms in favourable locations with a surplus of labourers* - This region is characterised by a high average age of farmers, as well as by a very high percentage of farms with less than 5 ha of usable agricultural area, which is very rapidly turning to unused usable agricultural area. This region is as labour intensive as category 1; yet, while such an intensity is economically sustainable in type 1, it is caused by lack of alternatives as regards this category, thus representing a surplus. This region is to be found almost exclusively at the southern border of the Italian Alpine arch.

- *Type 5: Area of high farmland abandonment with remains of cultivation* - This typology is characterised by unfavourable conditions as well as by a very small farm structure. This region has the highest share of unused usable agricultural area, which has increased up to 86% in the last 10 years. This agrarian structure region can be found predominantly in Italy and only occasionally in Austria.

- *Type 6: Structured, full-time agricultural region with a tendency towards intensification* - Although characterised by high farm abandonment (-45% in the last decade), this region presents a strong reversion of unused agricultural area back to cultivation as well as a focus on full-time farming. These features testify a tendency towards intensification. This region is mainly dominated by cattle-breeding, as 80.7% of farms are specialised in pasture farming. This category can be found predominantly in Switzerland.

- *Type 7: Alpine "standard region" on the way towards part-time farming* - This is a typical intensive tourism region, while agriculture is under-represented. Most of the manpower is employed in the tertiary sector, while the percentage of part-time farmers, although already high (64.9% of farms with part-time farming), is still increasing. This category is predominantly located in the Northern part of the Alps.

- *Type 8: Large-scale cattle breeding in a morphologically favourable location* - This region is characterised by a high share of usable agricultural area, thanks to the favourable conditions, and a high number of employees in agriculture (10.6%). 55% of farms covers more than 10 ha and most of the farms are run by full-time young farmers (70.2% of farms with full-time farming). Yet, part-time farming is slightly increasing (+6.2% in the last decade). Similarly to region type 6, 84.3% of farms are specialised in pasture farming. This category characterises the Swiss agriculture at the borders of the Alps.

Whereas categories 1 and 3 are characterised by a low percentage of farm abandonment, typologies 2, 4, 5 and 6 are heavily affected by farm abandonment, while this phenomenon is moderate in categories 7 and 8. On the other hand, agrarian structure regions 4 and 5 are affected by high farmland abandonment along with a strong and rapid agricultural decline. Significantly, these categories are widespread in the Italian Alpine arch. For these reasons it is worth considering these two typologies more into details.

Small-scale grassland farms in favourable locations with a surplus of labourers (Type 4).

As already mentioned, this category, which can be found only at the southern border of the Italian Alpine arch and particularly at lower altitudes, is affected by a high rate of both farm and farmland abandonment. The percentage of unused usable agricultural area is rapidly increasing, together with the number of over-aged farmers. The model region chosen within the SUSTALP project is the mountain area around the river Piave, located in the Italian province of Belluno. The most important indicators for this area are reported in Table 5.4.

Indicator	Alps	Type 4	Piave (model region)
Population density (inhabitants/km^2)	62	134	147
Employment rate (%)	43.9	43.9	43.5
Employed in agriculture (%)	5.6	3.3	3.1
Rate of older people (>65 years)	14.9	16.0	18.1
Rate of children (<15 years)	17.2	14.9	12.7
Migration balance (from 1987 to 1997) (%)	3.7	2.7	1.6
Tourism intensity (beds/inhabitants)	0.25	0.1	0.03
Farms with part-time farming (%)	64.3	79.6	80.4
Decrease in part-time farming from 1987 to 1997 (%)	-9.4	-7.4	-11.7
Farm abandonment factor (changes from 1987 to 1997) (%)	-14.9	-14.3	-18.9
Farmers > 45 years (%)	68.3	77.5	82.2
Small farms (< 5 ha UAA) (%)	65.4	87.2	88.5
Decrease in UAA (changes from 1979 to 1997) (%)	-4.8	-12.5	-15.8
Permanent grassland area/UAA (%)	67.7	63.4	82.3
Permanent crop area/UAA (%)	6.2	6.3	0.7
Decrease in livestock (L.U.) (changes from 1979 to 1997) (%)	-8.9	-13.5	-9.9

Table 5.4 – Socio-economic and agricultural indicators for agrarian structure region 4 and its model region. Data are referred to beginning of the nineties, ranging from 1988 to 1996. Source: Tappeiner *et al.*, 2003a

This region, of which the Piave area is well representative, is characterised by intensive cultivation (typically maize) concentrated in the valley floors, where these are not occupied by urban settlements, as the area is densely populated. Yet, agriculture plays a minor role, while the economy is based on the secondary and tertiary sectors, although tourism is just marginally developed. Even though the demographic situation might appear critical (high rate of older people, low percentage of children and low migration balance), it is quite normal when compared with the general trend affecting north-eastern Italian provinces.

Agriculture is characterised by small farms, mostly managed by older, part-time farmers. Indeed, due to the small farm size, farmers had to find a second occupation, mainly in the secondary sector. While for many farmers this gave them the opportunity to continue to run their agricultural enterprise, for an increasing number of them the second, more attractive job represents a reason for giving up farming. That is why UAA is strongly decreasing, along with the number of (part-time) farmers.

In particular, the uplands are mostly abandoned and nowadays the majority of the area is covered by mixed deciduous woods. Since the remaining farms are very poorly modernised and the average age of farmers is high, it is likely that agriculture will completely collapse within the next decade. The distribution of agrarian structure region 4 is shown in Figure 5.13.

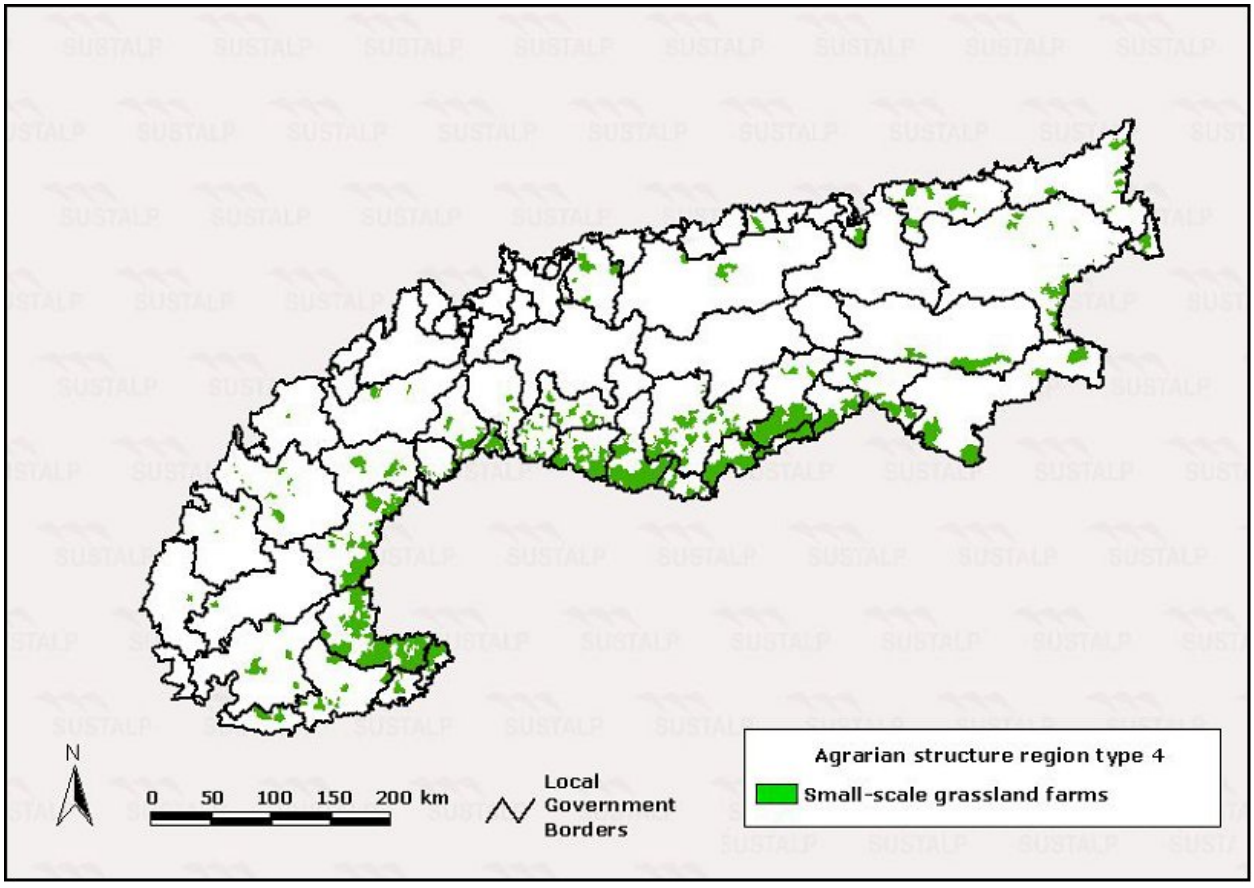


Figure 5.13 – Distribution of agrarian structure region 4. This category has been identified as being particular prone to marginalisation and abandonment processes. Source: Tappeiner *et al.*, 2003b

Area of high farmland abandonment with remains of cultivation (Type 5).

As the previous one, also this category is widespread in the Italian Alps, particularly at higher altitudes. The general conditions are unfavourable for agriculture, which is about to collapse in this region. For a large part farmland abandonment has already taken place, so that the percentage of unused usable agricultural area is the highest among the identified agrarian

structure regions types. The model region chosen within the SUSTALP project is Carnia, an area located in the Italian region Friuli-Venezia Giulia. The most important indicators for this area are reported in Table 5.5.

Indicator	Alps	Type 5	Carnia (model region)
Population density (inhabitants/km^2)	62	27	18
Employment rate (%)	43.9	42.8	39.2
Employed in agriculture (%)	5.6	4.8	5.5
Rate of older people (>65 years)	14.9	16.9	23.4
Rate of children (<15 years)	17.2	14.5	12.1
Migration balance (from 1987 to 1997) (%)	3.7	0.8	-1.0
Tourism intensity (beds/inhabitants)	0.25	0.3	0.24
Farms with part-time farming (%)	64.3	73.2	89.4
Increase/decrease in part-time farming from 1987 to 1997 (%)	-9.4	-20.2	+4.7
Farm abandonment factor (changes from 1987 to 1997) (%)	-14.9	-22.1	-12.3
Farmers > 45 years (%)	68.3	75.0	80.8
Small farms (< 5 ha UAA) (%)	65.4	84.5	93.8
Decrease in UAA (%) (changes from 1979 to 1997)	-4.8	-23.2	-32.8
Permanent grassland area/UAA (%)	67.7	89.7	93.3
Permanent crop area/UAA (%)	6.2	3.2	0.6
Decrease in livestock (L.U.) (%)(changes from 1979 to 1997)	-8.9	-11.9	-34.2

Table 5.5 – Socio-economic and agricultural indicators for agrarian structure region 5 and its model region. Data are referred to beginning of the nineties, ranging from 1988 to 1996. Source: Tappeiner *et al.*, 2003a

According to Table 5.5, this region is characterised by a critical demographic situation (very high average age, low percentage of children, high level of depopulation) coupled with overall bad economic conditions (lower than average employment rate, unfavourable employment situation in the industrial and service sectors), which appear to be even worse as when focusing on primary sector (very high average age of farmers, extremely high percentage of small farms). The most common reactions to such an unfavourable context are part-time farming, on the one hand, and farmland abandonment on the other hand, with particular regard to pasturing farming, which represents the most common agricultural land use. Accordingly, the region as a whole – and the selected area in particular – are mostly covered by secondary forests.

It is also worth mentioning that the social status of farmers in the model region is very poor, as farmers are socially and culturally not recognized. The distribution of agrarian structure region 5 is shown in Figure 5.14.

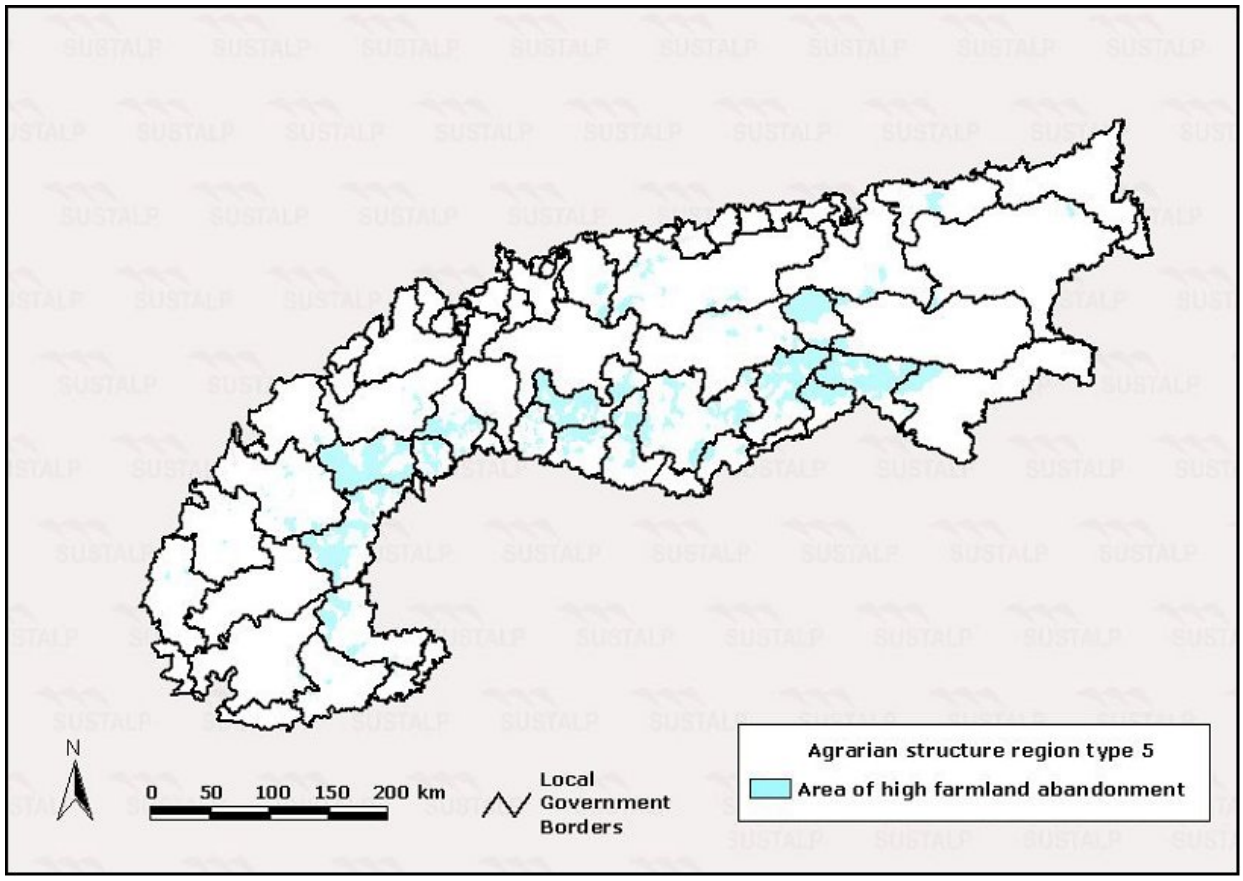


Figure 5.14 - Distribution of agrarian structure region 5. Source: Tappeiner *et al.*, 2003b

5.3 – Forest expansion

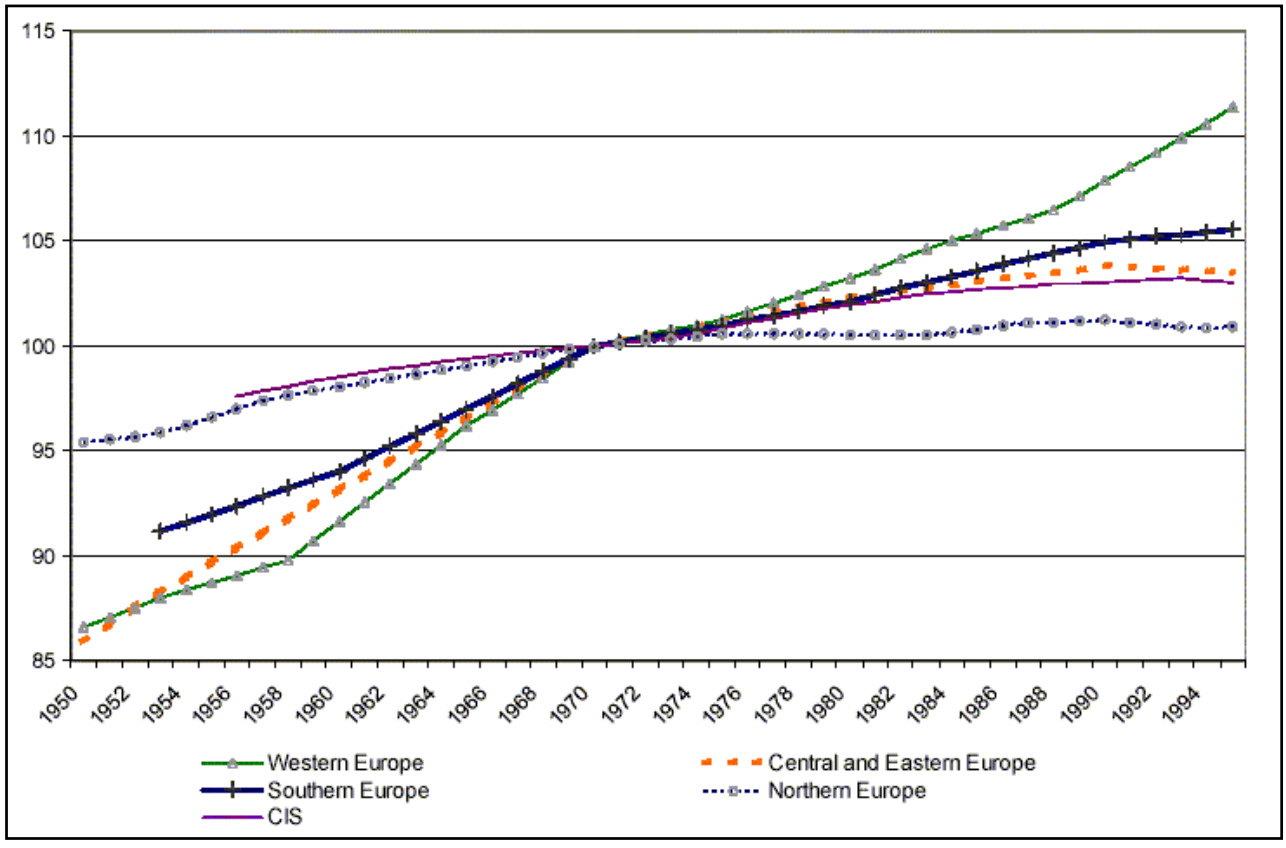
Wherever marginalisation leads to a process of extensification and, eventually, abandonment of farming activities, heavy and often irreversible landscape changes take place. Among those, spontaneous afforestation and the consequent expansion of wooded areas is the main and most evident indicator of land desertion. Even though forest expansion might sometimes come as a result of planned, artificial afforestation, the dramatic increasing of woods in Europe is mostly due to spontaneous invasion of shrubs and trees on farmlands or pastures no longer utilised.

Neither at European nor at national level have ever been gathered data on forest expansion specifically referring to mountain areas. While data have been gathered at national level, in most of the cases these data have not been disaggregated, so that no statistics are available as regards Alps. Therefore, this paragraph will provide data at national level, focusing on mountain areas whenever possible. However, for this and other reasons – which will be explained below – trends are more significant than data themselves, and a qualitative rather than quantitative approach should be adopted while considering land cover changes (Piussi and Pettenella, 2000; Agnoletti, 2004).

5.3.1 – European trend

A recent research implemented in the framework of the *European Forest Sector Outlook Study* (EFSOS) confirms that Europe is characterised by a quite steady general increase of forest area, the intensity of which, however, varies considerably between different countries and regions: in Western Europe, for example, the forest area has increased by almost 30% during the last 50 years (see Graph 5.6).

Policy driven land use changes towards planned forestry and, more recently, natural forest colonisation on abandoned agricultural land have been identified as the primary causes for woodland expansion.



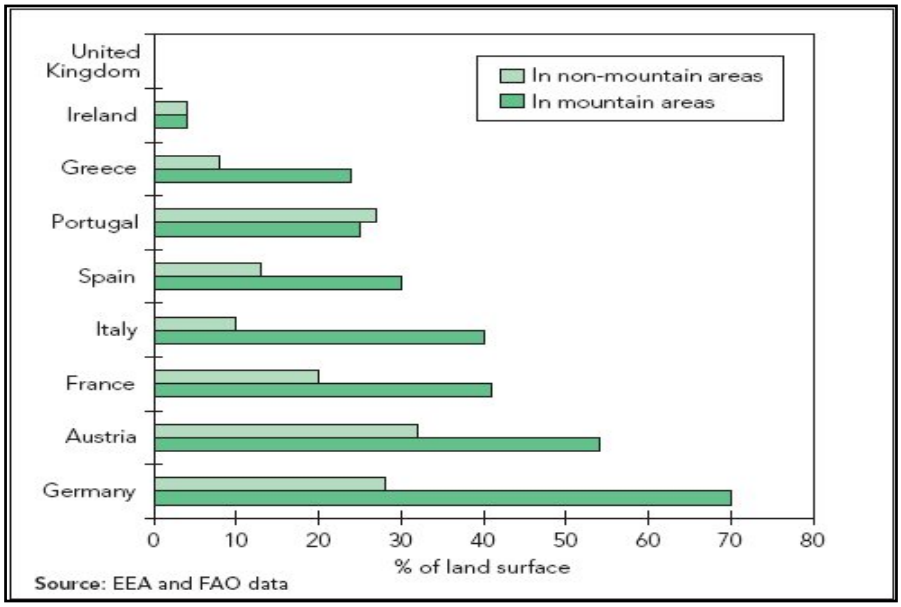
Graph 5.6 - Development of forest area in Europe by regions (1970 = 100%). Source: UNECE/FAO Forest Resources Assessment, in: Gold, 2003

Note: The problem of the comparability of the data provided by different countries and publications was partly solved thanks to the assistance of network of forest resources assessment specialists in the countries, who provided corrections to the Forest Resource Assessment (FRA) source data and harmonized national data sets, employing methods to adjust data to the current TBFRA definitions (Gold, 2003).
Western Europe includes: Austria, Belgium, France, Germany, Ireland, Luxembourg, Netherlands, Switzerland and United Kingdom; Central and Eastern Europe includes: Albania, Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia and Former Yugoslavia; Southern Europe includes: Greece, Italy, Portugal, Spain and Turkey; Northern Europe includes: Denmark, Finland, Norway and Sweden; CIS includes Russian Federation.

Notably, the growth of forest area has slowed down since the beginning of the seventies in all sub-regions[1], with the exception of Western Europe. Nevertheless, the trend is still positive and – in absolute terms – the increase in forest cover is remarkable (Gold, 2003).

Nowadays, about 36% of Europe's land surface (excluding Russia) is covered by Forest and Other Wooded Land (FOWL)[2], although this share varies widely, from 1 to 74%; the largest forest areas are in the Nordic countries and in mountainous regions (Eurostat, 2001; UNECE/FAO, 1999) (see Graph 5.7 and Figure 5.15).

As far as the European Union is concerned, according to the *Temperate and Boreal Forest Resources Assessment* (TBFRA)[3], in the year 2000 Forest and Other Wooded Land covered around 136 million hectares, equivalent to 43.68% of the then EU-15 territory (Eurostat, 2003), that is 1% more than in 1999, when the total surface was around 135 million hectares, equivalent to 42% of the EU-15 territory (CEC, 2002).



Graph 5.7 – Forest shares inside and outside European mountains. Source: EEA, 1999a

[1] Several factors contributed to slow down forest growth: while in the first period after World War II major afforestation efforts were made in order to compensate for previous clear cutting, in the last decades timber self sufficiency is no longer a political issue due to the current global dimension of timber trade; moreover, urbanisation and the expansion of human infrastructures caused a dramatic contraction of wooded areas in the lowlands (Gold, 2003). Finally, wood industry has been gaining much importance in Eastern European countries during the last decade.

[2] *"Forest*" is defined as land with tree crown cover (or equivalent stocking level) of more than 10% and area of more than 0.5 ha. The trees should be able to reach a minimum height of 5 m at maturity *in situ*. "O*ther Wooded Land"* is land with either a tree crown cover (or equivalent stocking level) of 5-10% of trees able to reach a height of 5 m at maturity *in situ*; or a crown cover (or equivalent stocking level) of more than 10% of trees not able to reach a height of 5 m at maturity *in situ* (e.g. dwarf or stunted trees) and shrub or bush cover (Eurostat, 2003).

[3] TBFRA 2000 is a part of the global Forest Resources Assessment (FRA) process led by the FAO Forestry Department.

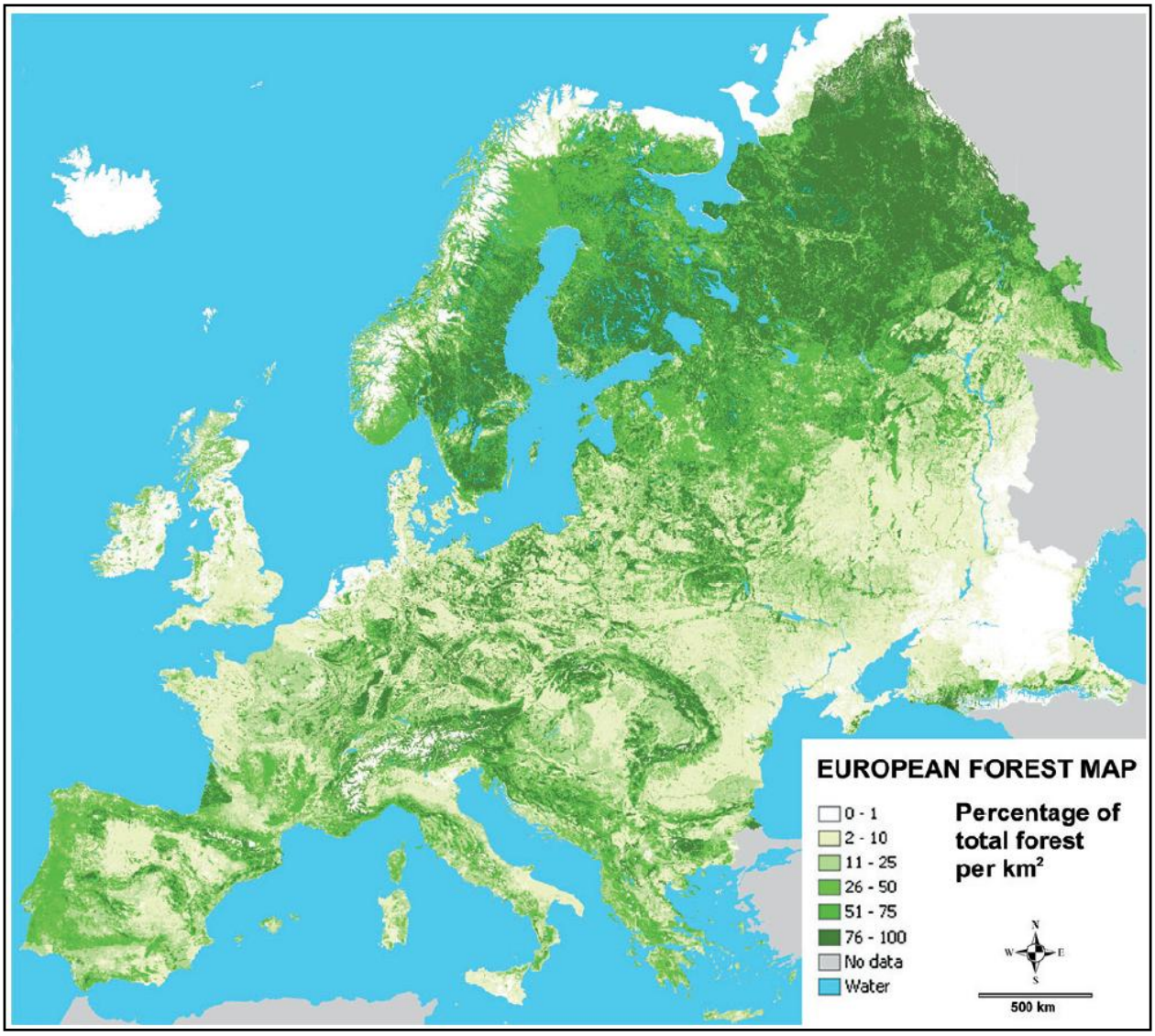


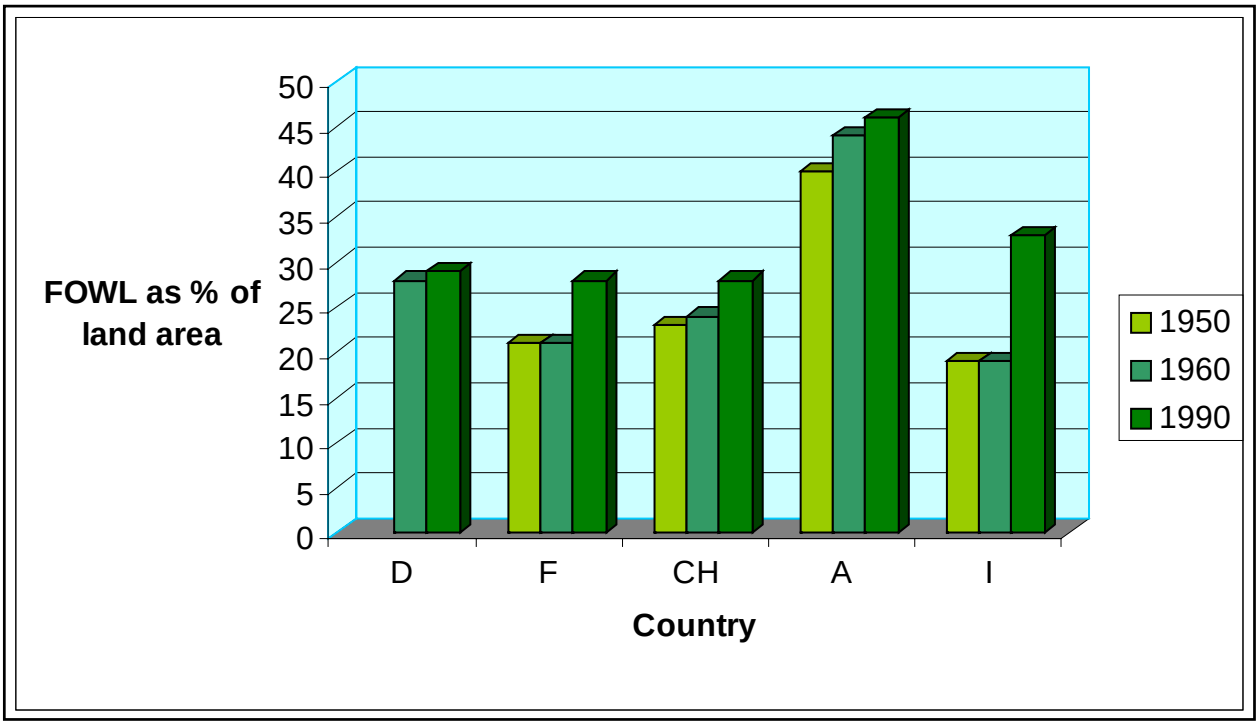
Figure 5.15 - Forest distribution map developed by the Joint Research Centre, the European Forest Institute and VTT Automation by combining satellite data with statistics from EUROSTAT and national statistical data (Source: Eurostat, 2003)

Some detailed data for the former 15 Member Countries are provided in Table 5.6, while the trend regarding Alpine countries in particular is displayed in Graph 5.8. Although the data do not specifically refer to the Alpine territory within each country, it is interesting to note how forest area strongly increased in all of the countries, and especially in Italy.

In particular, several studies on forest expansion have been undertaken which focus on Switzerland, where forest area expanded by about 30% during the 20th century, and the abandonment of agricultural land was identified as the main reason for that (Brändli, 2000).

	Land area	FOWL			FOWL as % of land area		
		1950	1960	1990	1950	1960	1990
		(1000 ha)			(%)		
Belgium	3,052	601	604	646	20	20	21
Denmark	4,309	444	490	466	10	11	11
Germany	35,702	--	10,162	10,490	--	28	29
Greece	13,163	2,000	2,578	3,359	15	20	26
Spain	50,479	12,550	--	13,509	25	--	27
France	54,396	11,407	11,608	15,156	21	21	28
Ireland	7,027	89	268	591	1	4	8
Italy	30,132	5,648	5,781	9,857	19	19	33
Luxembourg	259	81	82	86	31	32	33
Netherlands	3,388	250	276	339	7	8	10
Austria	8,386	3,352	3,691	3,840	40	44	46
Portugal	9,191	2,467	2,600	3,383	27	28	37
Finland	30,453	21,874	21,157	21,883	72	69	72
Sweden	41,093	22,980	24,054	27,264	56	59	66
United Kingdom	24,382	1,252	1,623	2,469	5	7	10

Table 5.6 – Changes in forest extension in the EU-15 territory from 1950 to 1990. Source: FAO Temperate and Boreal Forest Resources Assessment, 2000

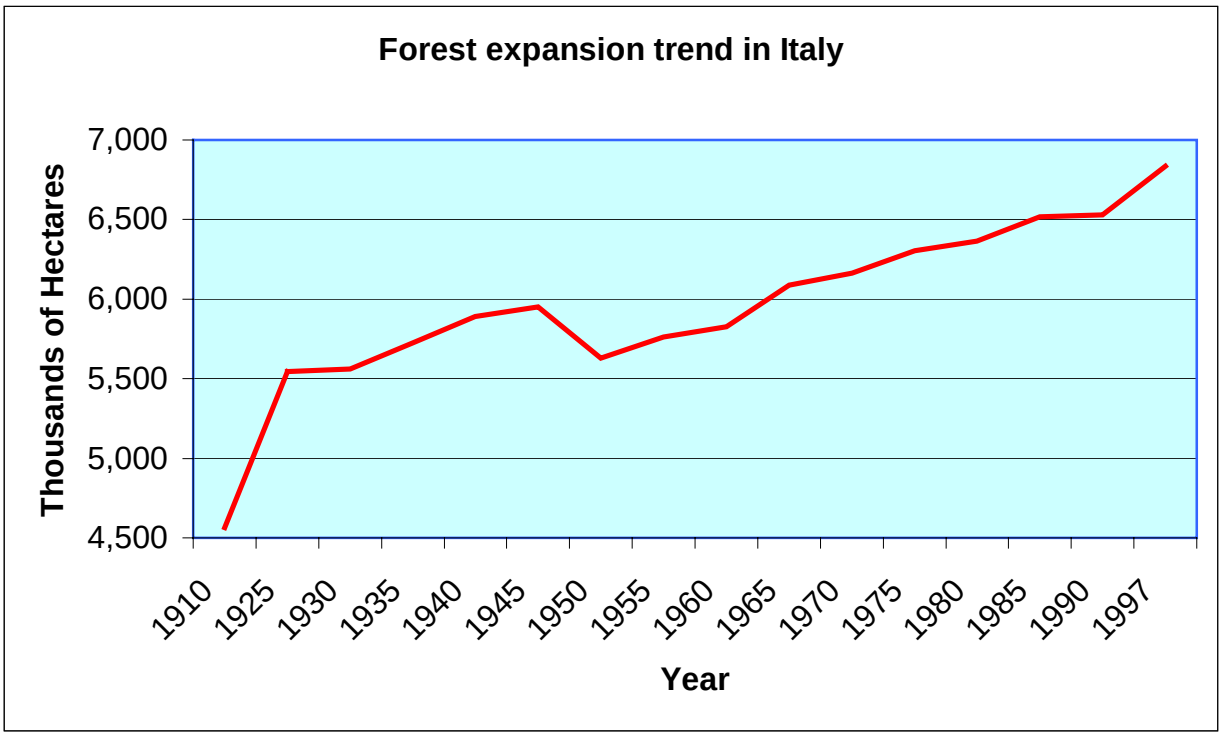


Graph 5.8 – Changes in forest extension in some Alpine countries from 1950 to 1990. Source: own elaboration of the data provided in the table above from the FAO Temperate and Boreal Forest Resources Assessment, 2000

5.3.2 – Italian trend

From the data above one can easily deduce that, although farmland abandonment and afforestation processes do occur in most of European countries, the magnitude they reach is apparently maximum, both in absolute and relative terms, in Italy (Piussi and Pettenella, 2000). One of the reasons for that is the large extension of mountain regions, which cover more than a half of the national territory, together with the great variety of mountain landscapes and contexts. Indeed, forest areas have been strongly increased in Italy during the past 60 years. Invasion of forests into farmlands represents, from a quantitative point of view, the most important change in land use which took place in Italy during this period (Piussi and Pettenella, 2000). Although the process was already evident in the fifties and sixties, a dramatic increase of the abandonment trend can be observed during the last decade, following a further decline of mountain farming; the results of such a boost will be evident in the next future, posing serious problems to sustainability of mountain territories (Pettenella, personal communication, 2004). In particular, spontaneous afforestation started relatively recently at lower altitudes in the Prealpine regions, where – on the other hand – favourable environmental conditions have caused a much faster change in the rural landscape than at higher altitudes, where the process started well in advance (Piussi and Pettenella, 2000).

According to the *National Statistical Bureau* (ISTAT), during the second half of the 20th century forest areas increased by 14.9%, and the increment was of 7.0% only in the last decade of the century (Piussi and Pettenella, 2000) (see Graph 5.9 and Table 5.7).



Graph 5.9 – Forest expansion trend in Italy. Source: own elaboration from data provided in Table 5.7

Year	Area (hectares)	Variation (%)	1910 = 100
1910	4,564,000	--	**100.0**
1925	5,545,000	21.5	121.5
1930	5,563,000	0.3	121.9
1935	5,726,000	2.9	125.5
1940	5,889,000	2.8	129.0
1945	5,949,000	1.0	130.3
1950	5,629,000	-5.4	123.3
1955	5,761,000	2.3	**126.2**
1960	5,826,000	1.1	127.7
1965	6,089,000	4.5	133.4
1970	6,162,000	1.2	135.0
1975	6,306,000	2.3	138.2
1980	6,363,000	0.9	139.4
1985	6,519,000	2.5	142.8
1990	6,529,000	0.2	143.1
1997	6,837,000	4.7	**149.8**

Table 5.7 – Forest area in Italy between 1910 and 1997. Source: ISTAT, adapted by Piussi and Pettenella, 2000

Note: the remarkable increase of forest area in 1910-25 period is due to the annexation of new territories, while the decrease between 1946 and 1950 is due to the reduction of Italian territory after World War II

Yet, two elements need to be kept in mind while taking these data into consideration: ISTAT data are collected using criteria that have been modified through time, and the expansion of forest areas is also consequence of planned afforestation programmes, though for a small portion. Indeed, according to Piussi and Pettenella, afforestation investments – particularly those financed by Reg. 2080/92 – played a minor role as a cause of forest expansion, while natural afforestation processes have been representing a primary cause.

Moreover, the monitoring of these trends is extremely difficult, since the dynamics of forest cover is very rapid and active. Even classification criteria might differ from one inventory to another: to give an example, the *CORINE Land Cover* survey for Italy in 1996 estimated a forest area of 7.2 million hectares (that is 0.4 million hectares more than those declared by ISTAT), because CORINE inventory ascribes to forest land areas which ISTAT would not consider as such[1]. In addition to that, 2.5 more million hectares of different types of shrubland identified by

[1] *CORINE Land Cover* survey for Italy is part of the EU project CORINE (Coordination of Information on the Environment). It is based on satellite images interpretation, while ISTAT is based on data collected on the ground, which are periodically updated (Piussi and Pettenella, 2000).

the CORINE survey are to be added, totalling 9.7 million hectares (see Table 5.8). Within this category, the area classified as "transitional woodland and shrub" amounted to 1.6 million hectares (Piussi and Pettenella, 2000).

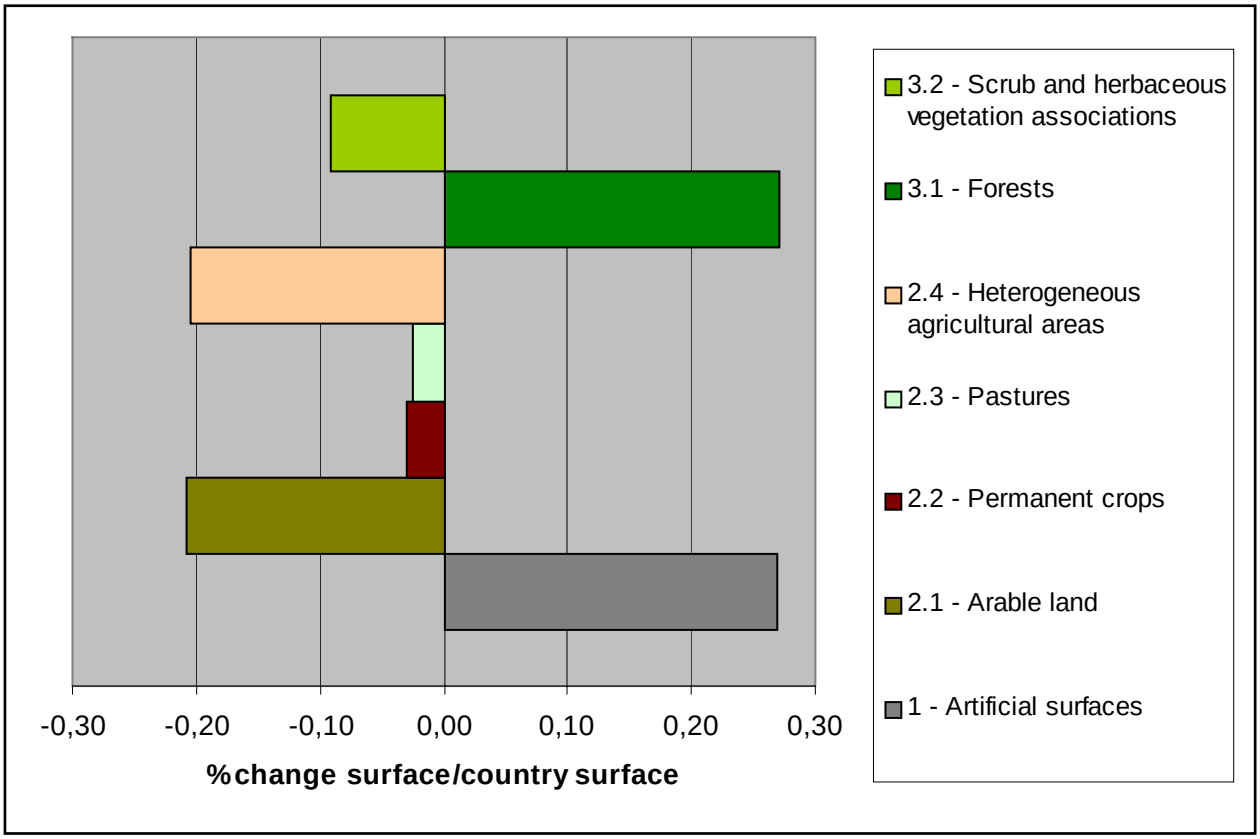
	Nat. Stat. Bureau (ISTAT) (1997)	CORINE Land Cover (1996)	Agricultural Census (1990)
Broadleaves	5,203,000	4,902,000	3,728,000
Conifers	1,439,000	1,309,000	1,105,000
Mixed forests	360,000	974,000	676,000
Total forests	7,002,000	7,285,000	5,509,000
Shrubland	n.a.	2,536,000	n.a.
Total forest land	n.a.	9,821,000	n.a.

Table 5.8 – Forest area in Italy (ha) by different statistical sources (Source: Piussi and Pettenella, 2000)

As regards the Italian territory, significant are the results obtained by *IMAGE and CORINE Land Cover 2000* (I&CLC2000), a project launched by the European Environment Agency (EEA) and the Joint Research Centre (JRC), consisting in the update of the CORINE Land Cover 90 (CLC90) database. The aim of I&CLC2000 is to produce the CLC database for the year 2000 as well as to detect Land Cover Changes (LCC) in Europe occurred during the period from 1990 to 2000, based on the data provided by the first inventory (CLC90) and the satellite image coverage of IMAGE2000 (EEA, ETC/TE, 2004).

More particularly, IMAGE and CORINE Land Cover 2000 project identified the changes occurred in the nineties for each of the 15 wider categories designated as Corine Land Cover Code Level 2. Graph 5.10 shows the changes referring to those categories identifying vegetation cover: while open grassland and agricultural areas such as arable land, pastures, permanent crops and other kinds of farmland significantly shrank, forest area dramatically increased.

The top five changes occurred in land cover in Italy between 1990 and 2000 are listed in Table 5.9. It is worth underlining that the most important changes concern forest categories: 78,076 ha of "transitional woodland and shrub" (a category defined as "*bushy or herbaceous vegetation with scattered trees, which can represent either woodland degradation or forest regeneration/re-colonisation"*) turned either to broad-leaved (78.3%) or to coniferous (21.7%) forest. In addition to that, more than 18 thousand hectares of new transitional woodland and shrub developed from natural grassland, which is likely to further evolve to forest within a few decades (EEA, ETC/TE, 2004).



Graph 5.10 – Land cover changes in Italy (1990-2000): vegetation cover categories. Source: own elaboration of data from EEA, ETC/TE, 2004.

		From… → *…to…*	
	Area (ha)	**Land cover 1990**	**Land cover 2000**
1°	61,158	3.2.4 Transitional woodland shrub	3.1.1 Broad-leaved forest
2°	23,254	2.4.3 Land principally occupied by agriculture, with significant areas of natural vegetation	3.2.3 Sclerophyllous vegetation
3°	18,285	3.2.1 Natural grassland	3.2.4 Transitional woodland shrub
4°	17,127	2.1.1 Non-irrigated arable land	1.1.2 Discontinuous urban fabric
5°	16,918	3.2.4 Transitional woodland shrub	3.1.2 Coniferous forest

Table 5.9 – Top five changes between land cover categories for Italy. Source: EEA, ETC/TE, 2004

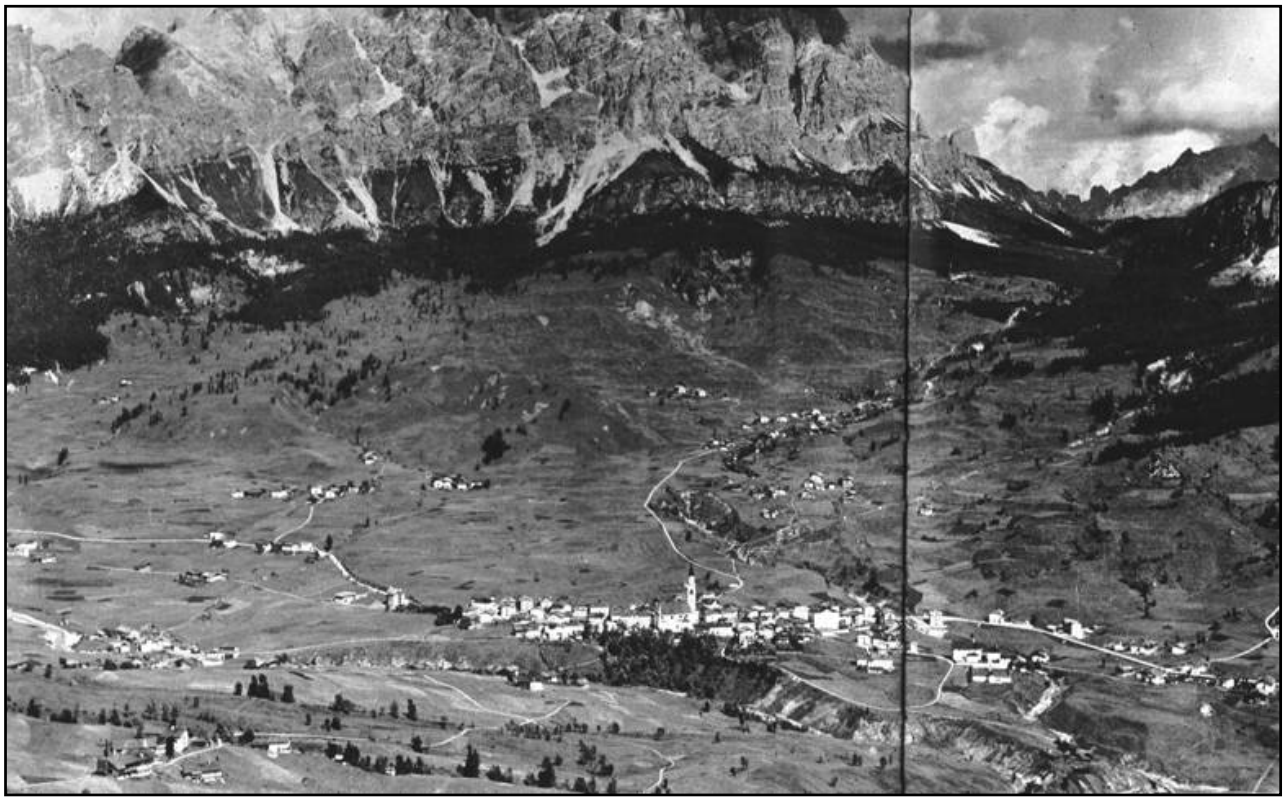
Despite the magnitude of the phenomenon, such processes have been initially ignored by the Italian scientific and technical world (Piussi and Pettenella, 2000) and to date no comprehensive studies have been undertaken regarding forest expansion trends in Italy. While the successional process has been described in several sites all over the country, the phenomenon has not been studied at broad level, e.g. Alps.

At national level, the most recent *National Forest Inventory* dates back to 1985[1], while a new one is still in progress. On the other hand, rare examples of studies at regional level have been carried out in Veneto and Tuscany, although not specifically focusing on mountain areas. In Veneto a research on fallow land dates back to 1984 (Franceschetti, 1984), while a more recent research was undertaken in 2002 by the Regional Agency for the Development and Innovation in the Agro-forestry Sector (ARSIA), focusing on landscape evolution in Tuscany.

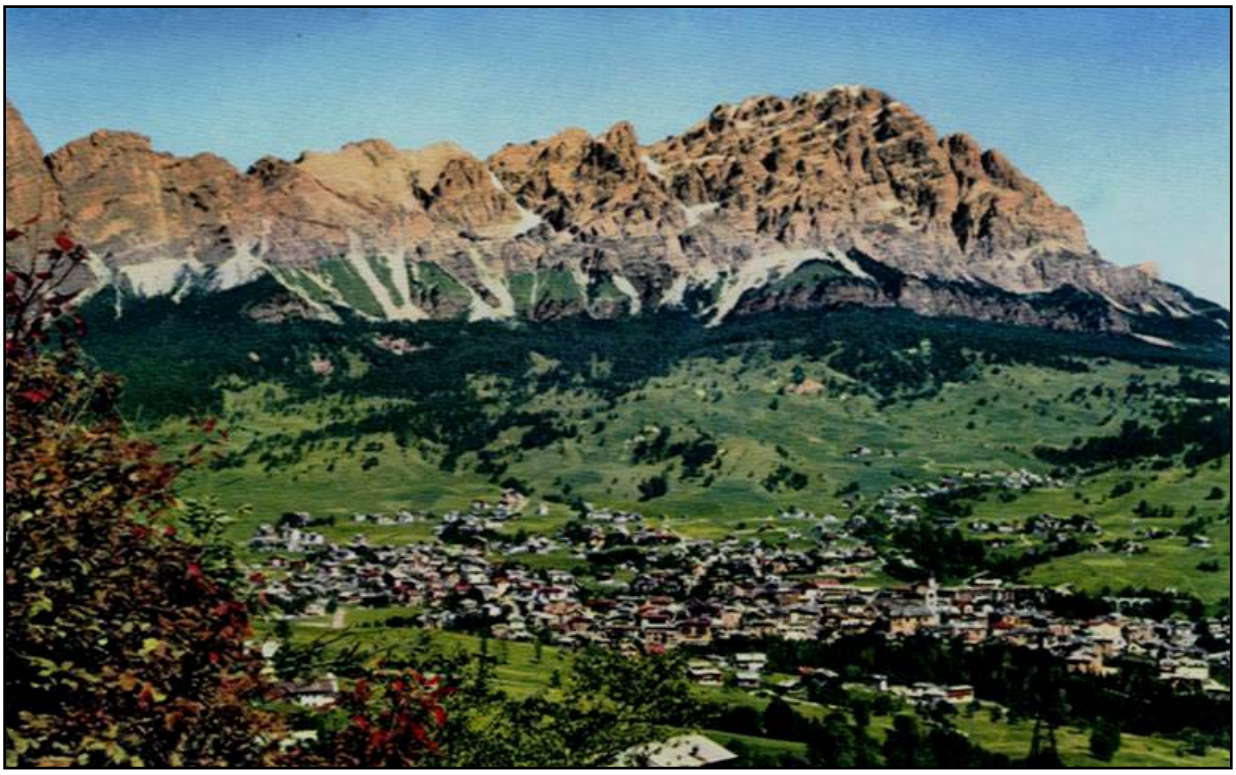
According to this study, forest areas increased by 33% from World War II until the end of 20th century, so that woodlands nowadays cover about 55% of the current productive surface in Tuscany (Agnoletti, 2002), 16% of which being scrub and shrubland, among the first successional stages resulting from the re-colonisation of pastures and formerly cultivated lands by vegetation.

5.3.3 – Forest expansion in Italy: some pictures

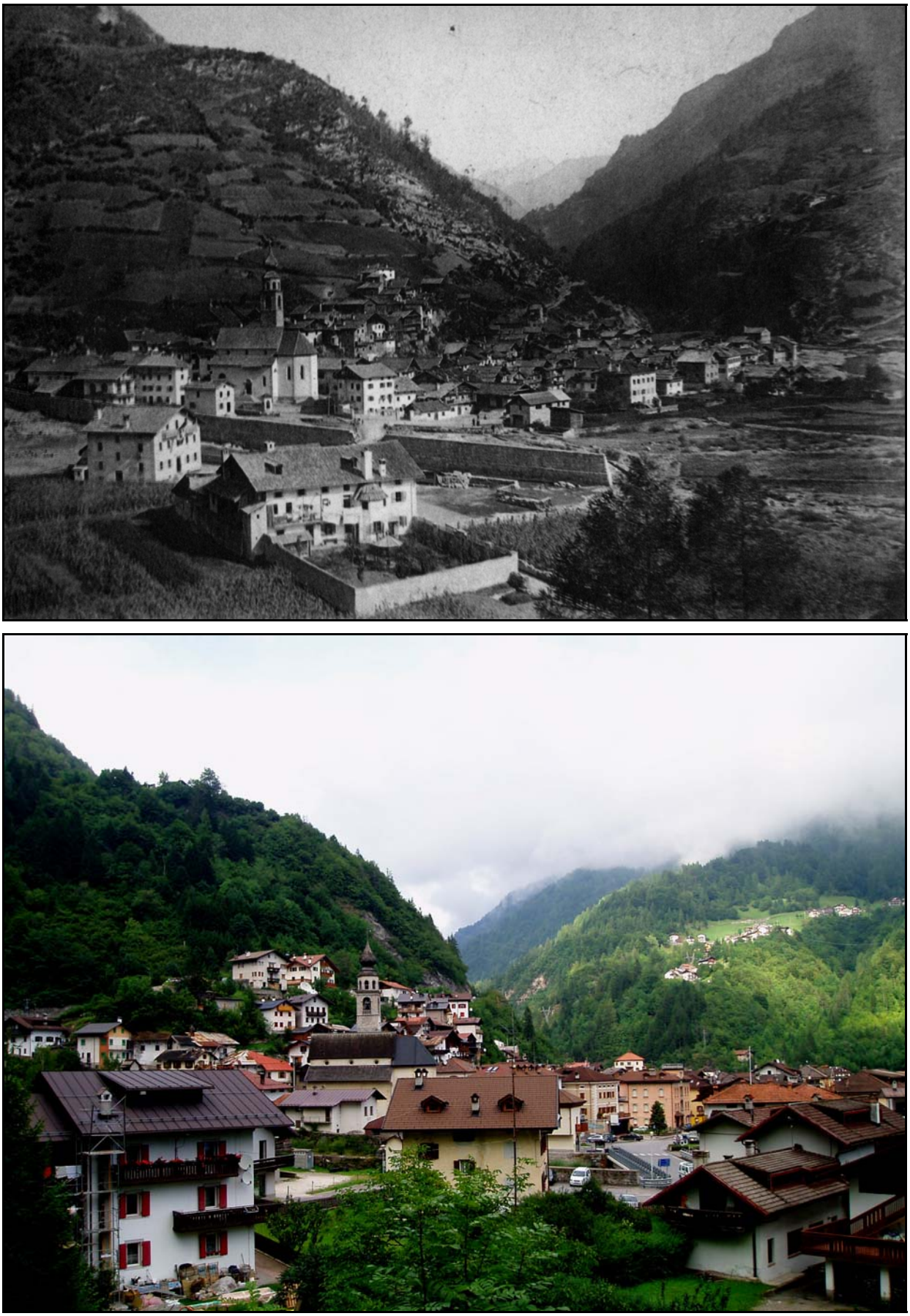
Although precise and up-to-date national and regional data are lacking, it cannot be denied that forest expansion is a marked and unambiguous trend, which everybody could recognize. Some clear evidences are provided by the pictures below (see Figures from 5.16 to 5.24).



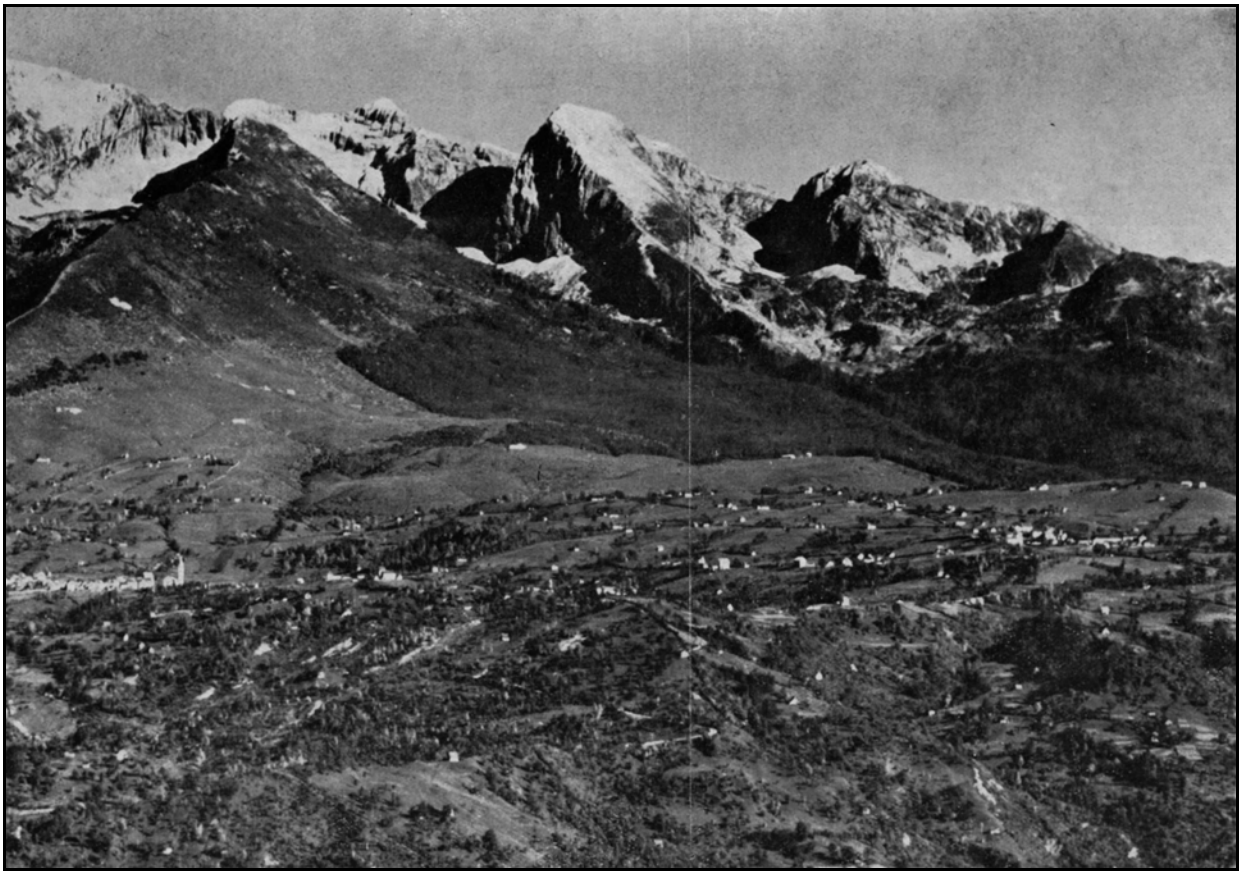
[1] According to the *National Forest Inventory*, forest areas in Italy in 1985 amounted to 8,302,000 ha.



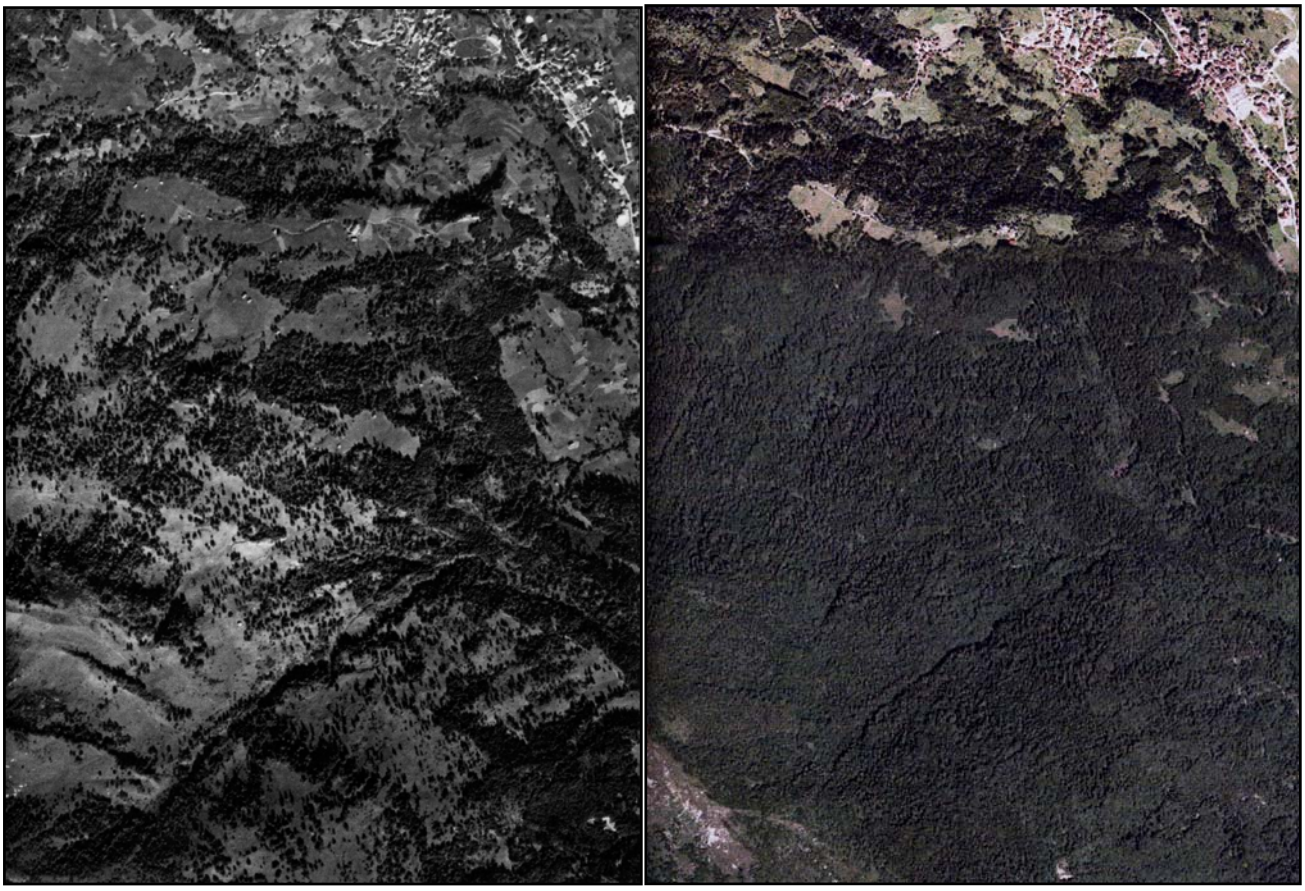
Figures 5.16, 5.17 and 5.18 - The worldwide famous tourist resort Cortina d'Ampezzo (Province of Belluno, Italy) in: 1903 (previous page, at the bottom), 1958 (above) and 2004 (below). These pictures are representative of an outstanding example of *agricultural* marginalisation. Source: Lacedelli, 2004



Figures 5.19 and 5.20 – Cencenighe (Province of Belluno, Italy) in 1900 ca. (above; source: Archivi Alinari, Firenze) and 2005 (below)



Figures 5.21 and 5.22 – Alpago (Province of Belluno, Italy) in 1930 ca. (above; source: Trame, 1932) and 2005 (below)



Figures 5.23 and 5.24 – Aerial photos of Mount Talm (Province of Udine, Italy) in 1957 (left) and 1998 (right). These pictures are representative of a typical case of *geographical* marginalisation, since the area has been affected by overall negative demographic and economic trends during the last decades. Source: Candido, 2004

CHAPTER 6 – IMPACTS

6.1 – Background: mountain farming, bio-cultural landscapes, bio and eco-diversity

The third Conference of the Parties to the Convention on Biological Diversity held in Buenos Aires in 1996 recognized the positive externalities provided by agriculture by adopting a multi-year programme of work aimed at "*promoting the positive effects and mitigating the negative impacts of agricultural practices on biological diversity in agro-ecosystems and their interface with other ecosystems*" (COP-CBD, 1996).

Unfortunately, while negative impacts caused by intensive agricultural practices are still widely costly investigated and recognized by public opinion, the favourable interactions between agriculture and environment and the ecological and social services provided by agro-ecosystems such as landscape and wildlife conservation, soil protection and health (in terms of fertility, structure and function), water cycle and water quality, air quality, carbon sequestration and so on (Aarnink *et al.*, 1998), remain largely disregarded (Dax and Wiesinger, 1997).

Most of the studies still focus on the negative impact of agriculture and land use changes rather than how do land use systems contribute to biodiversity patterns; because of the detrimental impact of farming practices on flora and fauna during the last decades, agriculture and nature conservation are often perceived just as a source of conflicts (Baudry, 2003). Indeed, negative impacts caused by certain kinds of agricultural practices are undoubtedly, since they are serious and evident, particularly in terms of water consumption and pollution, soil erosion, land consumption and habitat fragmentation.

Until the very beginning of the 20th century, agriculture and nature were strongly interconnected, to the point that it was often difficult to distinguish which part of the land was "natural" and which part of the land was cultivated. Using a modern terminology, we may say that by that time land used agriculturally had a "high nature value", which was maintained by the extensive use of agricultural land, causing very limited pressure on natural resources. Such a situation was not due to the intention of the farmers, who – on the contrary – tried to maximise food production within the constraints they faced, such as natural barriers and the limited expertise then available. At that time farming was very labour intensive, but very capital extensive. The outputs provided were food and a high environmental quality.

Yet, in the course of time, the composition of inputs in agriculture changed dramatically. Agriculture became increasingly dependent on capital, introducing machinery and agrochemicals and eventually allowing increasing production at the expense of labour. By doing

so, the nature value of farmland decreased considerably, causing a widespread and dramatic biodiversity loss (Brouwer and van der Straaten, 2002; Tucker and Heath, 1994).

Nowadays, "*the loss of biological diversity of much of Europe's farmland*" is "*largely a result of the continuing decline in traditional, extensive and mixed farming practices, the intensification of agriculture and the abandonment of farming in certain regions*", so that "*action to preserve biological diversity is urgent*" (High-level Pan-European Conference on Agriculture and Biodiversity, 2002).

Yet, in spite of the remarkable decline of biodiversity on Europe's farmland there are, varying by region, still many agricultural areas of high natural value left that urgently require efforts for their conservation and management (IUCN, 2000). Indeed, certain kinds of agricultural practices still offer a lot of positive externalities, particularly in terms of creation and maintenance of high value habitats and ecosystems, biodiversity conservation, up-keep of the hydrogeological and hydrological balance, landscape variety and soil protection.

Demonstration projects co-financed under Life-Nature programme have been used to determine the farming practices best suited to maintaining or even enhancing the natural value of sites in terms of the habitats or species that society wishes to protect (Delpeuch, 2004). Those farming systems associated with valued semi-natural habitats have been specifically referred to as *High Nature Value* (HNV) farming systems, including traditional farming systems, extensive pasturing systems, transhumance, organic agriculture and low impact agriculture such as no or minimum tillage (Baldock, 1999).

The expression "*High Nature Value (HNV) farming systems*" follows the definition of previously common terms such as *low intensity farming systems*, a word which has been associated with those farming systems "*which are low in their use of external inputs, especially fertilisers and agrochemicals*" and for this reason they can be distinguished from the intensive forms of agriculture dominating the more fertile regions of Europe (Beaufoy *et al.*, 1994). Low intensity farming is often associated with traditional practices, many of which are labour intensive, such as hand mowing. Indeed, traditional agricultural systems usually call for a considerable input of skilled work, for example to manage grazing systems and maintain features such as terraces, stonewalls and hedges (EC, 1997).

The advantages offered by this kind of farming systems compared with intensive agriculture do not just rely on the fact that they are less polluting and demanding in terms of exploitation of natural resources, but their major role in conserving habitats and their dependent communities of recognized European importance has to be taken into account, along with their social and cultural value (Beaufoy *et al.*, 1994). Low intensity farming implies a number of land uses such

as seasonal grazing, often coupled with forage provided by hay meadows, and products typically include meat and dairy products. Transhumance and other seasonal movements of livestock between grazing areas (such as the vertical transhumance, locally called *alpeggio*) are an important feature of these livestock systems (*ib.*).

While the definition of low intensity farming systems is based on the inputs employed, the expression "*High Nature Value farming systems*" mainly refers to the output provided, leaving the inputs out of consideration. This category is therefore not limited to traditional farming practices only, but includes all of those systems which are somehow responsible for the creation and maintenance of high nature value farmland habitats, such as alpine pastures, hay meadows, crops characterised by a great variety of small plots with different land uses, field margins where formed by natural features such as brooks, hedgerows or even dry-stone walls, as well as all those natural or semi-natural habitats which can be found within or alongside farmland and for this reason they are strongly influenced by its management (Baldock, 1999; Genghini and Busatta, 2001).

Although these kinds of farming systems take many different forms and vary widely from one part of Europe to another, we might affirm that the large majority of HNV farming systems are located within marginal agricultural areas, a great part of which are to be found in the mountains. Since the low intensity of farming is often a reflection of natural constraints, most of the farmland which is still extensively managed can be found in areas where there are severe physical handicaps on intensification, such as mountain areas. It is also the concentration of low intensity farming systems in less developed, often remote and predominantly agricultural regions, which gives them a pivotal role in the social, economic and cultural life of many areas (Beaufoy *et al.*, 1994).

Indeed, the overwhelming majority of mountain farming practices are extensive forms of agriculture, and many of their outputs may be considered as high nature value semi-natural habitats. According to the Council Directive 92/43/EEC "on the conservation of natural habitats and of wild fauna and flora" (the so called "Habitats" Directive), natural habitats are "*terrestrial or aquatic areas distinguished by geographic, abiotic and biotic features, whether entirely natural or semi-natural*" (CEC, 1992), which means that "natural" habitats also include "semi-natural" areas, created and maintained by human activities, such as pastures, traditionally farmed lands and cultivated woods[1]. In many cases their natural characteristics would disappear if agricultural work or animal rearing were to cease (Delpeuch, 2004).

[1] Most of European countries have no forest "undisturbed by man" (UNECE/FAO, 1999), while European forests have been being utilised, managed or even cultivated for several centuries.

Even though it is difficult to quantify or exemplify the agricultural and forestry land included in the *Natura 2000* sites, according to some estimates about half of the designated sites are farmed environments (Bennett, 1997), since several types of species-rich grasslands are listed in Annex 1 of the Habitats Directive (Baldock *et al.*, 1996). From a strictly ecological point of view several semi-natural habitats directly or indirectly created by extensive farming practices, such as extensive pastures, hay meadows, grazed wetlands and moorland habitats, support a wider range of species than might otherwise be found in purely natural mature vegetation covers (Mac Donald, 2000). A high proportion of flora and fauna depend upon semi-natural habitats and mosaics of farmed and forested land cover (Brouwer and van der Straaten, 2002).

As a matter of fact, agriculture has moulded, during the centuries, a semi-natural environment where endemic and threatened species have often survived. Nowadays, non-intensive forms of agriculture maintain a variety of both wild and domesticated plant and animal species, varieties or breeds, as well as ecosystems (CEC, 2001c). Such a great variety, with particular regard to domesticated species, is often referred to as *agrobiodiversity*, which describes the range and variety of biodiversity within the farmed landscapes (IUCN, 1999; 2000). More particularly, agrobiodiversity has been defined as "*the variability of animals, plants and micro-organisms on earth that are important to food and agriculture, which results from the interaction between the environment, genetic resources and the management systems and practices used by people. It takes into account not only genetic, species and agro-ecosystem diversity and the different ways land and water resources are used for production, but also cultural diversity, which influences human interactions at all levels*" (Aarnink *et al.*, 1998).

A similar idea was developed by Naveh, who firstly introduced the concept of *ecological diversity*, or *ecodiversity*, a term which refers to "*the total biological, ecological and cultural landscape heterogeneity at different spatial and perceptional scales*" (Naveh, 1994a and b), characterised by "*intrinsic and instrumental values of highly valuable, endangered semi-natural, agricultural and rural landscapes*" (Naveh, 1994a).

Likewise, the term *biocultural landscape*, or *biolandscape*, has been coined by AGER, an international agency for the protection of biocultural landscapes, defined as the "*spatial and perceptive expressions of agro systems whose landscape and morphological components join the genetic ones, including traditional cultivar, local cultural identities and rural architectures*" (De Bernardi, 2004).

Landscape heterogeneity in particular can thus be identified as one of the most important outputs of HNV farming systems, both in environmental and socio-cultural terms, by bringing

about positive externalities such as the maintenance of habitat variety and cultural heritage respectively. Yet, landscape is a complex and ambiguous concept, which needs to be clarified.

The definition here adopted is the one provided by the European Landscape Convention, which defines the landscape as "*an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*" (Council of Europe, 2000), so that landscape protection implies "*actions to conserve and maintain the significant or characteristic features of a landscape, justified by its heritage value derived from its natural configuration and/or from human activity*" (*ib.*).

Agriculture is of course one of the human activities which contributed to landscape construction the most. As regards mountains, for example, agriculture has, over long periods, developed and modified those assets commonly characterising mountain areas, in terms of biodiversity and habitat variety, water and soil resources, resulting in a joint natural and cultural heritage, which reflects the particular land management practices traditionally followed in a certain area (Euromontana, 1997).

Indeed, certain farming systems such as transhumance started already 6,000 years ago, when prehistoric farmers artificially reproduced an instinctive behaviour which pushed wild animals to move seasonally from either Mediterranean lowlands or valley floors to Alpine pastures, thus exploiting the peculiarities of the vertical structure of the Alps. Also some primitive forms of semi-sedentary farming developed at that time, when cultivation and animal husbandry were practised around the earliest Alpine settlements, which were inhabited only during the summer until about 2000BC. This latter way of life involved complete self-sufficiency in food production and it developed mainly in the inter-montane dry zones as well as the Southern side of the Alpine arch.

However, until around 500 BC the products of animal husbandry, although important, played a secondary role, while by that time Germanic tribes introduced a more animal-oriented diet, reversing the importance of the two fields of agricultural activities. Also Alpine landscape changed: in general, cultivated fields covered only small areas in the valleys, hay meadows occupied the most favourable areas at low and medium altitudes and Alpine pastures were to be found at higher elevations, although close ties linked lower and higher altitudes.

During the late medieval period, when some farms specialised in animal husbandry, thus occupying grasslands at the highest altitudes (particularly in the Western part of Eastern Alps), land exploitation in the Alps was at its maximum. At that time extensive clearings of forests took place, and natural Alpine pastures were notably enlarged to three of four times their size

(Stone, 1992). All over the Alpine territory pre-existing shrublands and forests were cleared or burned over large areas to increase the availability of wide open grasslands for livestock (Laiolo *et al.*, 2004). All altitudinal belts were affected by some change and basically all Alpine ecosystems were altered by human interventions.

The Alps as of 1350 AD were little different from how they looked like in the 19th century. Also the farming practices were very similar, such as the *alpeggio*, which is still in force today. Although there are countless local variants, the *alpeggio* is however based on a vertical structure: pastures at high altitude are grazed during summer months (approximately from June to September), while cattle livestock is moved back to valley floors for the rest of the year. Although the usage of silage is nowadays very common, hay for feeding livestock in winter is supposed to be grown below the timberline, especially around the summer settlements, while cultivated fields surround permanent settlements.

Therefore, every kind of land use in the Alps not only changed natural systems, but even resulted in the creation of completely new ecosystems. In particular, by clearing and opening up forests and introducing new plants for cultivation or pasturing, man significantly increased the diversity of plant species. Nowadays the Alps exhibit an impressive variety of habitat and climatic conditions along reduced spatial scales, reflecting a complex physical history, resulting from a long past of human presence and exploitation. A large part of the biodiversity of the Alps is therefore linked to anthropogenic or semi-natural environments (Chemini and Rizzoli, 2003). While Alpine landscape had been rather monotonous in its natural state, human intervention changed it by dividing the territory into small areas and diversifying their land use, creating more scattered different habitats (Stone, 1992).

Particularly evident is the case of Italy, where, even though the notable heterogeneity typically characterising the landscape is certainly fruit of the significant variety of geographical features, yet the complex cultural ecomosaic, which is one of the most valuable resources of the Italian territory, both in ecological and in economic terms, is primary due to human interactions, since the potential landscape would be more homogeneous, mostly covered by large forest patches.

Agriculture therefore provides people not only with income, food and fibre, but also with biodiversity, landscape, recreational spaces and various other goods and services. Such a multifunctional character of agriculture, with particular regard to the connections between agriculture, biological, ecological and landscape diversity, has been repeatedly highlighted and recently affirmed on the occasion of the High–level Pan–European Conference on Agriculture

and Biodiversity held in Paris in 2002, whose final declaration stated that "*agricultural lands form a very substantial part of the European continent and that the rich biological diversity and very valuable landscapes formed in the long interaction of humans and nature are highly dependent on the way the land is farmed and managed*" (High-level Pan-European Conference on Agriculture and Biodiversity, 2002).

Mountain farming in particular is linked to the fulfilment of the double function of agriculture today: to produce high quality agricultural products on the one hand and to contribute to the provision of ecological services on the other hand. Moreover, a third task has to be added to the previous ones: the maintenance of cultural landscapes and the related habitats, which nowadays represents the core performance of mountain agriculture, rather than the agricultural production itself (Dax and Wiesinger, 1997). Indeed, if farm management is adapted to its environment, then it improves biodiversity and landscape structure, consolidates soil conditions and protects water and air quality. By performing such important environmental services, the cultivation of mountain areas protects the valleys and downstream regions against natural hazards such as avalanches, landslides, soil erosion and floods (Dax and Wiesinger, 1998). The continuation of farm management in mountain areas thus plays a central role in regional development, by acting also as prerequisite and basic activity for other sectors, such as tourism (OECD, 1998). For all these reasons, and particularly for their potential to contribute to maintaining rich biotopes, low intensity farming systems are more and more valued by society (EC, 1997).

To summarise, we might say that mountain farming nowadays includes a number of functions, such as (Dax and Hovorka, 2004):

- to secure provision of high-quality and fresh foodstuffs;
- to ensure the natural fundamentals of life, i.e. soil, water, air and biodiversity;
- to shape, maintain and care for the cultural and recreational landscape;
- to provide raw materials and energy;
- to realise ecologically sound farming methods;
- to contribute to the maintenance of the population settlements and social and economic activities in the countryside;
- to provide an impetus for and renewal of the regional economy;
- to provide protection against natural hazards and other environmental services.

Since traditional and HNV farming systems in areas vulnerable to marginalisation are of great importance for cultural heritage, landscape variety and biodiversity, abandonment and

cessation of such management practices threaten these values and change the visual perception of the landscape. Indeed, contrary to what many people believe, abandonment of high nature value farmland is a major threat, like it is intensification (EC, 2000). The dynamics occurring in certain ecosystems as a result of the abandonment of non-intensive forms of agriculture has shown that the cessation of these agricultural practices is as much a threat to semi-natural habitats and the biodiversity they host as the intensification of production.

In particular, "*under-utilisation of agricultural land and its abandonment can have disastrous consequences for the environment in mountain regions, where the cessation of agriculture quickly leads to the reversion of higher flora rich areas to scrubs"*, affecting vertebrate and invertebrate populations as well (CEC, 2001c). Undergrazing, for example, may lead to the progressive disappearance of the abundant flora of extensive medium-altitude pastures, to the overrunning of habitats and their colonisation by semi-ligneous species (*ib.*). The abandonment of traditional land use systems thus results in a loss of pastoral value, soil erosion, fire risk, a decrease in biodiversity and threatened vulnerable species. Their abandonment or their conversion to more intensive land use forms usually produce negative effects, because these systems represent very old biological adjustments and equilibria that include complex foodwebs, migration patterns, symbionts and so on, representing delicate balances (Gonzalez Bernaldez, 1991).

For all these reasons we may affirm that what is somehow "artificial" is not always biodiversity-poor, while what is natural – well again, what it *has become* "natural" through a secondary successional process – is not always biodiversity-rich. On the contrary, many species are dependent upon farming activities to thrive (Baudry, 2003). Biodiversity may thus result from the combined interactions and relationships between natural circumstances and human influence (Chemini and Rizzoli, 2003) and environmental complexity might sometimes have anthropogenic bases, since the landscape mosaic characterising most of European rural areas can be considered as a synonymous of habitat variety, which brings together biological, cultural, historical, social, aesthetic and economic values.

Conversely, spontaneous afforestation on a large scale represents one of the main threats to such a great variety, being responsible for the disappearance of these valuable non-forest habitats (Zaiac, 2004) and for the homogenisation trend affecting European rural landscape.

6.2 – Environmental impacts

Mowing and livestock grazing are primary factors inhibiting woody plant succession. Successional processes take place after production disturbance ceases or decreases. The successional pattern in time and space depends on several factors, such as disturbance regime, life-history traits of the dominant plant and animal species, original heterogeneity of the landscape, previous land use and pre-existing vegetation cover and fauna (Preiss *et al.*, 1997).

Also the way in which land is abandoned is important in determining the environmental conditions for early colonisation by plants and animals and the subsequent successional processes: for instance, there may be no intervention after a crop, grazing may substitute cultivation or may not take place at all, grassland grazing may become more and more extensive, with lower and lower stocking rates (see Figure 6.1), and so on (Baudry, 1991).

The abandonment of semi-natural grasslands results especially in the expansion of forest and shrubby habitats in secondary grasslands, but also in an expansion of dwarf shrubs in the pastures above the timberline, i.e. primary grasslands[1] (Chemini and Rizzoli, 2003). Although we may affirm that on the whole abandoned open grassland gradually evolves to shrub communities and, eventually, woods, yet regional differences related to land use history, geology, altitude and exposure

Figure 6.1 – Farming practices might be gradually abandoned: in this case, despite the overall decline, vineyards and sheep grazing are still maintained

[1] While primary pastures are natural grasslands lying beyond the limit of tree vegetation, secondary pastures are somehow "artificial", in a sense that they result form the activities which men have been running over them.

may determine different medium and/or final stages within or at the end of the successional process (Cernusca *et al*., 1998a). In favourable cases, forest and its associated fauna can eventually replace cultivations or grasslands within a few decades (Preiss *et al.*, 1997). In the montane belt shrubs can cover pastures 6-7 years after abandonment, while the same process takes 10-12 years in the subalpine belt (Laiolo *et al.*, 2004).

Environmental consequences caused by farmland abandonment can be included into the following categories: biodiversity, ecodiversity and soil impacts[1]. All of them are difficult to be determined, as well as largely discussed whether to be considered as negative, neutral or positive effects. Moreover, in some cases there is a sort of temporal variability in the direction of the impact, as when considering the secondary succession[2] following the abandonment of meadows, fields or pastures from a biodiversity point of view. Moreover, the consequences of farmland abandonment on plant and animal communities have not yet been fully assessed.

6.2.1 – Bio - and eco-diversity depletion

Since the first World Summit on Sustainable Development and the following *Convention on Biological Diversity* (UNCED, 1992b), biodiversity has been unanimously considered as one of the most meaningful parameters allowing to express an estimation about the state of the biosphere (Pignatti, 2003). The definition of biodiversity includes all life forms, from single cells to complex organisms and processes, pathways and cycles that link living organisms into populations, ecosystems and landscapes (CEC, 2001c).

Biodiversity is generally recognized at three levels: genetic, species, and ecosystem (or community) diversity. *Genetic* diversity is the variety of genetic pools found among individual representatives of a species, thus being responsible for variation between individuals, populations and species. *Species* diversity is the variety of organisms living in a particular place and finally *ecosystem* diversity is the variety of species and ecological functions and processes occurring in different physical settings (*ib.*).

[1] The European Commission lists the following environmental problems caused to natural resources by agriculture: air pollution and contribution to climate change, soil degradation, water pollution and hydrogeological changes and adverse effects on biodiversity (EC, 1997). Yet, Euromontana identifies biodiversity, landscape and soil as the three categories mainly affected by farmland abandonment (Euromontana, 1998). While the visual and cultural meanings of landscape will be treated in the following paragraph, in this one landscape is mainly considered in ecological terms, and for this reason it has been substituted with the term *ecodiversity*.

[2] While primary successions start from bared soils, secondary ones develop on a previously vegetated soil, after a disturbing event.

Moreover, ecologists distinguish three different biodiversity components:

- *Alpha* (or within-habitat) diversity is the number of species that occur in a given area, which might be a locality, a region or even a continent. It thus refers to a group of organisms interacting and competing for the same resources or sharing the same environment, and it represents the simplest conceptualisation of biodiversity;
- *Beta* (or between-habitat) diversity measures species replacement; it is usually expressed in terms of similarity index between communities (or species turnover rate) between different habitats in same geographical area, and it refers to the response of organisms to spatial heterogeneity (Whittaker, 1972);
- *Gamma* (or geographical, or regional) diversity refers to all of the species in a certain region, defined as an area which does not include significant barriers to organisms dispersion.

Biodiversity plays a role in the two main components of the ecosystem stability: *resistance*, i.e. the capacity of maintaining an ecosystem function, and *resilience*, i.e. the capacity of recovering to normal function levels after disturbance. On this purpose biodiversity is also thought to have an *insurance value*: when environmental conditions change, more diverse communities have a greater probability of containing those species that are adapted to the environmental change and can more easily maintain ecosystem functioning compared with an impoverished community (Minns *et al.*, 2001).

Although ecosystems host many species, a large part of the work is performed by a few keystone species. Apparently, many species are of minor or no importance to ecosystem process; yet, to evaluate their role we must consider changing environments (Chemini and Rizzoli, 2003), such as those following a process of land abandonment.

While considering biodiversity trend related to the successional process, it is therefore important to keep in mind that the simple number of species is not always a significant indicator of the real state of the environment, since the relevance of single species, in terms of rarity, ecological function, biogeographical and evolutional meaning, is often even more noteworthy. During the secondary succession following farmland abandonment, ecologically specialised species actually disappear in favour of more competitive, less valuable ones. After the cessation of any kind of management, such as cultivation, woodcutting, grazing and burning, aggressive tall grasses and thistles crowd out smaller herbs and a dense, species-poor and highly combustible weed thicket establishes itself in what used to be open woodlands and grasslands (see Figure 6.2).

Figure 6.2 – Abandoned Alpine pasture in Pian dei Buoi, Province of Belluno (Italy)

This gradually leads to the dominance of a few taller woody plants and the almost complete suppression of the herbaceous undergrowth, which causes a heavy reduction of plant and animal diversity and the rapid loss of the richest and most attractive, more open and lower grass and shrubs "degradation" stages, including many light demanding, flowering geophytes and endemics (Naveh, 1994b).

Finally, at the end of the succession secondary forests, i.e. forests resulting by a process of spontaneous re-afforestation on a formerly cultivated or grazed terrain, are characterised by a different species composition than that of primary forests, i.e. forests that have not been interrupted during their successional evolution.

Moreover, biodiversity measurements vary significantly depending on the scale of observation, whether this refers to species, community or landscape level. To give an example, a recent research project focusing on various impacts caused by uncontrolled nature development in the Italian Val Grande National Park and Strona Valley[1] revealed a decrease in floristic diversity from lower to higher successional stages, thus a decline of the so-called *alpha*

[1] The research project, titled "*Changes in alpine landscapes resulting from a decline in land use in the Val Grande National Park and Strona Valley – from rural landscape to wilderness*", was run by the University of Freiburg (Germany), Department of Forest and Environmental Sciences - Institute for Landscape Management.

biodiversity at species level. On a larger scale (community level) both a decrease and an increase in the structural diversity have been observed: while on the one hand the number of vegetation structures decreases in the areas characterised by a mosaic of small plots of formerly cultivated land, commonly located around the villages, on the other hand diversity increases in those alpine areas historically largely utilised as meadows or pastures (Höchtl *et al.,* 2004).

Indeed, the existing vegetation and landscape structure is an important factor influencing ecodiversity evolution: where the original landscape is characterised by a variety of small plots, as well as in mountain areas already dominated by high forest cover, increased woodlands caused by abandonment processes may not be desirable, leading to a biodiversity loss due to a diminished variety of habitats (MacDonald *et al*, 2000). On the other hand, some degree of spontaneously reforested land might be assessed positively when large homogeneous grasslands such as open meadows and pastures represent the previously predominant landscape (Höchtl *et al.,* 2004).

To summarise, we may say that whenever large patches characterise landscape, then afforestation leads to an initial increase in the habitat variety, except in the case where such large patches are already dominated by forest cover. On the contrary, when small patches of open meadows, woodlands and cultivated fields shape landscape, then forest expansion might result in an increased landscape homogeneity and banalisation, finally leading to a reduction in the habitat variety. Quite obviously, the introduction of new woodlands might be assessed positively where they did not use to be in the past, while the expansion of forest areas might be seen as a negative trend where forests were already spread throughout the landscape.

However, in many cases – as mentioned above – there is a sort of temporal variability in the direction of the impacts. For instance, while floristic diversity is likely to increase in the very early stages (Höchtl *et al*., 2004; Brown, 1991; Baldock *et al.*, 1996), later on during the successional process, as the landscape becomes more uniform, biodiversity tends to decrease, according to the overwhelming majority of the authors, due to the invasion of aggressive pioneer or dominant species in former species-rich mountain meadows or pastures.

Abandonment of traditional farming activities is for example responsible for the disappearance of once common vegetal communities, such as certain high-altitude meadows like *Trisetetum,* or the contraction of some biodiversity-rich ecosystems such as those meadows characterised by the presence of *Bromus erectus*, threatened by shrub-invasion (Pignatti, 2003). More generally, the number of plant species is highest on lightly-managed meadows, while the species number declines with intensification on the one hand and abandonment on the other hand (Cernusca *et al.*, 1998a).

Another negative aspect deriving from farmland abandonment and decline of traditional farming activities in particular is agrobiodiversity depletion and the consequent loss of typical cultivar, deriving from a long-lasting process of artificial selection and consequently showing a high level of adaptability to local conditions. Nowadays there are increasing trends towards standardisation of seeds sources and breeds, and loss of local varieties. Since most of traditional species and varieties are adapted to local conditions, this standardisation could lead to a loss of potentially important benefits of genetic diversity (Minns *et al.*, 2001).

Also many animal species are damaged by vegetation re-colonisation, both because of the usually minor food availability provided by abandoned land compared with extensively cultivated land (Fernandez Ales, 1991), and because of the contraction of their habitats. Although anthropogenic in nature, semi-natural grasslands are long-established habitats with a complex structure and plant composition, a crucial factor for most wildlife (Laiolo *et al.*, 2004). Semi-natural habitats host many flora and fauna species whose natural habitats have widely disappeared, together with the large herbivores that used to maintain them. Many species thus became dependent on semi-natural manmade habitats, which are now essential substitutes for the original habitats (Baldock *et al.*, 1996). Indeed, the significance of semi-natural habitats for nature conservation in Europe is partly a reflection of the small remaining area of undisturbed natural habitat (Beaufoy *et al.*, 1994).

Several bird populations in particular are threatened by the reduction of open rural areas and wood recover (Farina, 1991), since farmland habitats are known to hold a rich avifauna, comprising several specialists that are highly dependent upon agriculture and open grassland (Pain and Pienkowski, 1997).

Birds species may indeed be classified into four major typologies (Laiolo *et al.*, 2004):

- *open habitat-grassland species*, i.e. species that require open fields both for breeding and foraging;
- *ecotone* (or *edge*) *species*, i.e. species that use grassland and woodland alternatively;
- *shrub species*, i.e. species that dwell in shrubby areas;
- *woodland species*, i.e. species typical of forest habitats.

While shrub and woodland species usually take advantage from scrub and tree encroachment, open-habitat grassland species such as rock partridge (*Alectoris graeca*) suffer from this process. As regards edge species, these may initially benefit from the increased heterogeneity of the habitat which often characterises the very early stages of successional process, while they are affected by the resulting landscape and habitat homogeneity, which reduces ecotones (Genghini and De Berardinis, 1999).

However, while several studies have been undertaken on the impacts caused by intensive agricultural and forestry practices on the avifauna, less attention has been paid to the effects of the more recent landscape changes resulting from land abandonment (Preiss *et al.*, 1997; Suárez-Seoane *et al.*, 2002; Laiolo *et al.*, 2004). Nevertheless, some of the best researched cases of abandonment threatening rare endangered species involve birds (Baldock *et al.*, 1996).

An example is given by a research carried out in 1997 focusing on vegetation and avifaunistic changes occurred in a hilly area covered by a mosaic of Mediterranean habitats located near Montpellier (Southern France), following rural depopulation and land abandonment. The study revealed that as a consequence of woodlands and shrubs expansion, the abundance of forest birds increased, whereas the abundance of open-habitat bird species decreased significantly (Preiss *et al.*, 1997). The identification of land abandonment as a main cause of avian diversity decline is also confirmed by other researches undertaken in Spain (Suárez-Seoane *et al.*, 2002). More precisely, Mediterranean shrubland species might firstly benefit from the initial transition from grasslands and old-fields to shrublands, but may ultimately decline as most of those evolve into woodlands (Preiss *et al.*, 1997).

The results of this study are particularly significant because they show that it is not the biodiversity purely meant in terms of number of species to suffer from vegetation re-colonisation, but it is the composition of the animal community which is affected: the land cover change promotes increased abundance and distribution of common bird species, while the persistence of some regionally rare Mediterranean species is under threat. Furthermore, it is also interesting to note that such a trend might be interpreted equally as a decrease in biodiversity in terms of increased homogeneity of the avifauna, as well as a return to a more natural state, i.e. before human interventions allowed these bird species to colonise the area (*ib.*).

While this study focused on a Mediterranean hilly area, though affected by farmland abandonment, some research projects have been undertaken specifically dealing with avifauna in the Alpine environment. As regards Italian Alps, a recent study focused on the Gran Paradiso National Park, where the decline of grazing activities has caused a significant reduction in grassland extension below the treeline (Laiolo *et al.*, 2004). Once again, the study found out that "*grasslands supported the greatest number of threatened species, whereas ecotones, woodlands and shrubs, respectively, held 11%, 4% and 0% of birds with an unfavourable conservation status*" (*ib.*). Since the previous landscape was rather homogeneous and open, shrub and tree encroachment initially led to increased bird biodiversity in terms of number of species, by temporarily increasing heterogeneity in habitat structure and providing foraging and nesting substrates.

Yet, once again one should take into account that the total number of species is not the only parameter which needs to be considered, because not all species have equal conservation value (Baudry, 1991). For example, several threatened open habitat species benefit from grazing to a large extent, particularly within the montane belt, where natural conditions favour rapid vegetation re-colonisation after abandonment. On the contrary, many woodland species favoured by pasture abandonment need no special assistance, while those woodland species holding unfavourable conservation status need mature forest habitats which would require centuries to develop from abandoned pastures (Laiolo *et al.*, 2004). Moreover, in several cases forests have become too dense and uniform for some species, such as the valuable capercaillie (*Tetrao urogallus*), requiring a structurally diversified forest (Chemini and Rizzoli, 2003; Bottazzo *et al.*, 2004). However, though in the long run valuable forest habitats may develop, forest habitats are currently less threatened than extensive grassland habitats (Keenleyside *et al.*, 2004).

The research concluded that "*in terms of bird conservation objectives, large-scale abandonment of semi-natural pastoral habitats and their replacement with scrub, or even forest, is likely to be detrimental, taking into account that upland grasslands are becoming important refuges for grassland species*" (Laiolo *et al.*, 2004).

More particularly, among the bird species which have been significantly reduced by shrub invasion on abandoned pastures in Italy are several tetraonids such as the black grouse[1] (*Lyrurus tetrix)* (see Figure 6.3), and the range of partridge, whose habitat is typically represented by open and semi-open fields, largely created and maintained by traditional farming practices, especially pasturing (Chemini and Rizzoli, 2003; Rotelli, 2004; Genghini, 2004). Although not specifically referring to Alpine areas, Farina too found out that in Italy cultivated land has the highest bird species abundance and richness, while the homogenous stands of woodlands which develop after long abandonment are relatively species poor (Farina, 1997). Moreover, to be threatened are also the migratory components of the avifauna, whose diversity is likely to reduce if the contraction of open habitats will continue (Farina, 1991).

Figure 6.3 – Black grouse (*Lyrurus tetrix*), an ecotone species threatened by shrub invasion and habitat homogenisation

[1] A recent study found out a correlation between the decrease in the number of cattle units driven up to Alpine pastures and the decrease in the number of black grouses in Carnia (Italy). While the first stages after abandonment benefited nesting, a strong reduction was recorded during the later stages (De Franceschi and De Franceschi, 2004).

Although the abandonment of mountain fields, meadows and pastures with the consequent expansion of shrubs and forests has caused a decrease in several animal species, such as birds, arthropod communities (Chemini and Rizzoli, 2003) and some vertebrates such as brown hare (Genghini, 2004), micromammals and bats (Farina, 1991), there are other species which benefited from this process, e.g. inner-forest species. For instance, some small mammals like marmot and porcupine, but above all several large mammals, e.g. wolves (*Canis lupus*), lynxes (*Lynx lynx*), bears (*Ursus arctos*) and ungulates, such as wild boars (*Sus scrofa*), red deer (*Cervus elaphus*) and roe deer (*Capreolus capreolus*), have been recorded to spread following land abandonment (Farina, 1991; Baldock *et al.*, 1996; Genghini, 2004).

Particularly significant is the return of predators such as wolf and bear, which had even disappeared from most of the Italian Alps, because their habitat was increasingly reduced and fragmented as a result of the enlargement of both cultivations and urban settlements, but also because they were persecuted due to the conflicts with livestock. Conversely, the recent trend towards landscape homogenisation created woodland corridors allowing these animals to move and spread into areas where they had become extinct about a century ago.

The diffusion of large and medium mammals such as the wild boar and the roe deer in mountainous areas is probably related to the abundance of food resources in abandoned fields and to the change of landscape matrix from fields to woods, which increased forest areas and woodland connectivity[1] (Farina, 1991). Although the return of such valuable species is obviously positive *per se*, it is worth underlining that these species might locally become a true pest: wild boars, for example, damage cultivated fields, thus creating conflicts between land managers and farmers (Genghini and De Berardinis, 1999), while the presence of wolves threats livestock and deer inhibits natural renewal of trees within forests. Moreover, large mammals such as wild boars and deer cause an increasing number of severe car crashes along traffic routes crossing their areale.

Furthermore, land abandonment has allowed the increase in suitable habitats both for the ticks and their main hosts as rodents, shrews and deer. Open-habitats fragmentation may also result in concentration of individuals and species dwelling in these habitats into restricted areas, promoting transmission and exchange of parasites. Therefore, the importance of disease could increase in shrinking ecosystems such as open habitats, with the emergence of new diseases and increasing numbers of epidemics (Chemini and Rizzoli, 2003).

[1] Connectivity has been defined as the degree to which the landscape facilitates or impedes movement among resource patches (Taylor *et al.*, 1993).

For other animal species the impact of land abandonment is ambiguous. For instance, a homogeneous grazed herb layer significantly reduces snail diversity and abundance, while the initial heterogeneity caused by abandonment seems to favour snail diversity both at the local and landscape scales. However, the increased landscape homogeneity characterising the later stages of abandonment creates unfavourable conditions for snail communities and it has been observed that sheep grazing contributes to the expansion of suitable habitats for rare snail species (Labaune and Magnin, 2002).

Thus, as regards biodiversity, while the major threat is commonly perceived as intensification, the opposite trend towards farmland abandonment can have equally serious effects and should not be assumed to benefit conservation (Suárez-Seoane *et al.*, 2002). The contribution to nature conservation of HNV farming systems is not limited to the maintenance of certain key habitats or the conservation of a few "flagship" species; these systems also are fundamental to the management of extensive areas of wider countryside which is essential to the long-term maintenance of viable European wildlife populations and communities (Beaufoy *et al.*, 1994). Results from several studies specifically investigating on these issues, such as the BIODEPTH project[1], suggest that preserving and restoring grassland diversity may be beneficial to maintaining desirable levels of several ecosystem processes, and may therefore have applications in land management and agriculture (Minns *et al.*, 2001). As a whole, tree and shrub encroachment leads to a decrease in open ground habitats and eventually reduces heterogeneity in the landscape, which in turn may reduce biodiversity (Genghini and De Berardinis, 1999). Of course, different is the case where are poor lands in terms of biological and/or visual interest to be extensified or even abandoned, such as intensive agricultural areas or improved grassland. In this case, abandonment usually results in an overall increase in the diversity of flora and wildlife and eventually the conservation value (Baldock *et al.*, 1996).

6.2.2 – Soil erosion, hydrogeological instability and natural hazards

Having developed under human influence for hundreds of years, agricultural ecosystems in environmentally sensitive areas remain vulnerable to inappropriate changes in the intensity of production, in the water regime or green cover, which could result in soil deterioration, erosion

[1] The BIODEPTH project, funded by the European Commission within the fourth Framework Environment and Climate Programme, represented the first multinational, large scale experiment aimed at examining directly the relationships between plant diversity and the processes that determine the functioning of ecosystems, testing also whether ecosystem processes are affected by a decline in plant diversity in European grassland. The project started by the observation that much of the grassland pasture or hay meadow, covering half of the farmland of Europe, is being impoverished in plant species due to several processes, among which land abandonment and changes in grazing and mowing regimes play a primary role (Minns *et al.*, 2001).

and landslides (EC, 1997). Several semi-natural environments such as agro-ecosystems have indeed become dependent upon the supply of external inputs, artificially provided. Neglect of previously cultivated or otherwise managed land thus implies, generally speaking, great consequences in terms of loss of stability and ecosystems' resilience, given that a system whose equilibrium has been artificially altered needs continuous flows of energetic inputs in order to be maintained as such. Since these inputs are no longer provided in case of abandonment[1], this might lead to a period characterised by instability and uncertainty of indeterminate length[2]. The duration of such a time frame depends on several factors. However, this transitional period lasts for approximately 200-300 years, depending on the site conditions; in high and arid locations, for instance, it might last for many hundreds of years (Stone, 1992).

Indeed, even in the case of natural hazards a temporal variability in the direction of the impacts caused by land desertion can be observed. Even though in the short term neglect of mown or grazed alpine pastures determines an increased risk of natural hazards, yet in the long term the development of a tree cover usually – although not always – results in greater slope stability and a considerable reduction of the risks (MacDonald *et al*., 2000).

Although it might be argued that the adoption of a very long term vision makes such evolution desirable, eventually leading to a more "natural" state, i.e. more similar to the primitive conditions which used to prevail before human beings started to exert their influence, yet it has to be taken into account that throughout the intermediate stages of secondary succession ecosystems are unstable and there is a greater danger of natural disasters.

In order to better comprehend such a fundamental concept, a similitude might be useful: a man, who has been treated by giving him a certain medicine, becomes dependent upon that medicine, no matter whether he initially needed it or not. Once the therapy is interrupted, the organism starts suffering, since its previous equilibrium was subject to exogenous inputs. Until a new equilibrium has been found, a period characterised by instability and vulnerability to diseases takes place. Likewise, the same course of action occurs in semi-natural environments when they are abruptly abandoned: ecosystems became so altered by centuries of use, that they experience great difficulty in self-regulation, when abandoned, leading to serious problems such as erosion, diseases and fires.

[1] On this purpose, it is important to distinguish between situations of spontaneous abandonment and planned withdrawal from agriculture, such as the set - aside scheme, where land cultivation is temporarily and/or intentionally suspended.

[2] To give an example, with regard to traditional Spanish land use systems it has been observed that "*their abandonment or their conversion to more intensive land use forms usually produce negative effects, because these systems represent very old biological adjustments and equilibria that include complex foodwebs, migration patterns, symbionts, etc. representing delicate balances*". As a consequence, "*loss of pastoral value, soil erosion, fire risk, decrease in biodiversity and threatened vulnerable species*" resulted (Gonzalez Bernaldez, 1991).

For instance, several short as well as long-lasting changes can be observed as a consequence of land desertion, in terms of spatial structure of plant canopies, soil organic matter status and turnover and biogeochemical cycles. Abandonment usually leads to a decrease in litter decomposition and nutrient availability, along with a diminished soil respiration[1] as well as an increased proportion of photosynthetically inactive components of the biomass. As a whole, these changes can eventually cause a considerable increase in slope instability and natural hazards, mainly due to the development of a biomass of vegetation tending to form a frozen mulch in the cold seasons. This implies an increased risk of snow-slides, avalanches and associated landslips (Cernusca *et al*., 1998a).

In particular, the effects of land abandonment on soil erosion have been largely discussed: in some cases, it has been observed that managed meadows and pastures are significantly less erodible than abandoned grasslands, the latter being more prone to landslides in topsoils (Tasser *et al.,* 2003). According to the results obtained by the European project INTEGRALP (INTERREG II), aimed at evaluating the risk of erosion due to changes in land use within sub-alpine and alpine study sites, the erosion risk decreases when the land is covered by grass and herbs, while it increases as a coverage with dwarf shrubs grows; in particular, older abandoned areas covered with dwarf shrubs to an extent of 40-65% are especially at risk (*ib.*).

Some of the reasons for this can be found in the increased frequency of snow gliding, a slow downward movement of the snow cover on a slope[2] which especially affects abandoned sites due to their different vegetation structure (Newesely *et al.*, 2000; OECD, 2002; Tasser *et al.,* 2003): snow gliding and particularly snow abrasion due to the transport of stones cause injuries to soil which represent potential break-off point for landslides. Moreover, the typical vegetation characterising abandoned meadows and pastures, such as stemmed tussock grasses and tall and rigid dwarf shrubs, shows resistance especially during winter months, thus transferring the forces of the snow to the soil surface; as a consequence, tension fissures or even open spots appear in the soil, once again acting as starting points for landslides in topsoils and mud flow events, especially in case of heavy rainfall in summertime (OECD, 2002; Tasser *et al.,* 2003). A decrease of gliding can only be observed when stronger lignified shrubs or small trees appear (Newesely *et al.*, 2000).

[1] It has been observed that soil respiration, which reaches the highest value in pastures, decreases by 15 to 30% in meadows and even by 30 to 50% in abandoned grassland (Cernusca *et al.*, 1998a).

[2] Snow gliding means that the whole snow cover moves downslope along the surface of the soil. Unlikely avalanches, the movements are slow.

Apart from snow gliding, also root density and depth represent a possible factor for increasing erosion risk: since they decrease with time of abandonment, due to the increasing soil acidification, soil becomes less stable. The INTEGRALP project concluded that "*mowing and pasturing cause a decreased erosion potential, while abandoned grasslands carry a higher erosion risk*" in several Alpine sites (Tasser *et al.,* 2003).

Within the framework of another European project called ECOMONT, a research project aiming at investigating ecological effects of land-use changes in European terrestrial mountain ecosystems, Cernusca *et al.* observed a decrease in upper soil aggregate stability in several research sites after abandonment, possibly resulting in a reduction of water storage capacity and potential infiltration (Cernusca *et al.*, 1996). On the contrary, in other cases colonisation of abandoned meadows and fields by a dense shrub cover seems to reduce both water runoff and soil erosion, determining a reduction of sediment yield at the basin level: this happens particularly where cultivated fields used to occupy even the most steep slopes and stony soils, thus causing heavy soil erosion and mass movements, such as in many Mediterranean mountain areas (García-Ruiz *et al*., 1995; 1996; Llorens *et al.*, 1995).

The reduction in sediment yield, which might be positively seen in the uplands since it comes together with a reduction in soil erosion, causes significant environmental and economic problems along the coasts, where the decrease in solid transportation at the mouth of the rivers changes the balance between erosion caused by the sea and sedimentation of soil transported by the rivers from eroded mountain slopes (Pranzini, 1994), thus enhancing beaches erosion, along with large scale disturbances on settlements, roads and other coastal structures (Piussi and Pettenella, 2000).

Moreover, since a dense shrub cover encourages water infiltration and increases rainfall interception, surface runoff is significantly decreased (García-Ruiz *et al*., 1996), thus resulting in higher water losses to the atmosphere[1] (Llorens *et al.*, 1995) and eventually a loss of water resources at basin level (García-Ruiz *et al*., 1995). Although it has been observed that both water runoff and soil erosion increase with decreasing density of plant cover, yet the highest values of soil erosion have been recorded when shrubs cover about 40-60% of the total surface, while meadows characterised by poor shrub cover (less than 15%) have a moderate soil loss, along with a modest quantity of runoff (García-Ruiz *et al*., 1995).

[1] Although forests control transpiration much better than grassland, they represent negative anomalies of the spatial distribution of soil moisture, because the effects of the greater rainfall interception overcomes that of differences in transpiration, thus strongly influencing basin water balance (Llorens *et al.*, 1995).

On the other hand, different is the case where are terraced sites to be abandoned. The degradation of the traditional terrace systems, which represent a common construction in the Italian rural landscape, is one of the most evident consequences of the abandonment of cultivation in mountain territories (Piussi and Pettenella, 2000). Indeed, in these contexts, significant land degradation problems occur, since the collapse of such artificial hydrological infrastructures comes together with the cessation of their protective function against soil erosion and runoff (Dunjó *et al.*, 2003). A severe cycle of degradation may be set in motion as terraces collapse and the disintegration of terrace walls potentially leads to landslips (Baldock *et al.*, 1996).

On this topic, the *Instituto Pirenaico de Ecologia* (IPE) and the *Geographie de l'Environnement* (GEODE) analysed several case studies in the Spanish and French Pyrenees (Llorens *et al.*, 1995; García-Ruiz *et al*., 1996). Significant is also the Italian case of Liguria, a region whose peculiar morphology imposed the creation and maintenance of typical terraced sites, nowadays largely neglected: the consequent land degradation problems have actually been posing serious threats to human settlements located along the coast, because of the proximity of mountain slopes to the coastline.

In Liguria, as well as in many other regions throughout Europe, hydrogeological disasters are also caused by obstructions along the rivers due to the uncontrolled invasion of riparian environments by vegetation and a general lack of care of mountain territories. Indeed, the abandonment of methods for both soil conservation and runoff control affect the hydrologic and geomorphologic functioning of hillslopes and fluvial channels (García-Ruiz *et al*., 1996).

A risk-reducing agriculture-forestry combination which might find examples in former multi-functional land-use systems may thus claim to be one of the most efficient and – in terms of cost-benefit ratio – most successful approaches. The best soil protection in mountains is thus constant, ecologically adapted agriculture (Messerli, 1989; EEA, 1999a).

Abandoned meadows and pastures are also more prone to fire hazards, due to the characteristics of the new vegetation cover (Höchtl et al., 2004; Abramo, 2004; Gonzalez Bernaldez, 1991; Fernandez Ales, 1991; Hubert, 1991). Beyond their ecological value and positive effects on biodiversity, fires, together with landslides and avalanches, pose a serious threat to human settlements. Moreover, the increased fire hazard is of particular importance especially in the drier regions, where repeated fire events followed by heavy rainfalls determine strong erosion of productive soil, which may finally lead to irreversible desertification (García-Ruiz *et al.*, 1991; Fernandez Ales, 1991).

Along with farmland abandonment, also neglect of forests and the decline in the once common practice of collecting wood and scrub for fuel and animal bedding, together with the lower vigilance provided by mountain inhabitants, contributed to the increase in the occurrence of wild fires (Baldock et al., 1996).

Land cover changes are closely connected with the energy regime as well. Reduced management and abandonment lead to a reduction of evapotranspiration and to a corresponding increase of the sensible heat fluxes to the atmosphere. Since abandonment also leads to an increasing accumulation of attached dead plant material within the canopy, absorbing light without any contribution to canopy photosynthesis, as a consequence a larger part of the absorbed radiation energy is converted into sensible heat (Cernusca *et al.*, 1998a).

Although the contribution of forest expansion in determining microclimatic changes has not been studied so far, it is quite obvious that the shift from open fields or meadows to woodlands might heavily influence local climate changes, e.g. at valley level.

6.3 – Socio-cultural impacts

As explained in Paragraph 6.1, European landscapes are not "natural landscapes", but "cultural landscapes", strongly modified by a continuous intervention of man on the environment. Using a Naveh's expression, we may state that "*our present landscapes are complex natural and cultural gestalt systems, which contain more than the tangible, measurable and quantifiable parameters of our space-time dimensions*" (Naveh, 1994b).

The disappearance of important features of cultural landscapes such as pastures, hay meadows and those small plots of cultivated fields scattered around mountain settlements brings about the depletion of the natural and cultural heritage associated with them. In particular, traditional land use systems are often maintained by the application of empirical knowledge and skills that can be irreversibly lost together with these landscape features (Gonzalez Bernaldez, 1991). Particular human skills and social institutions cannot readily be recreated once they have been lost (Hodge, 1998).

The most common change to landscape associated with marginalisation is the emergence of a less tidy landscape, characterised by an increased patch size with an increasing element of coarser vegetation and, eventually, closure of a previously open landscape. Studies in many marginal areas of Europe have shown a generalised increase in uniformity following abandonment (Baudry and Bunce, 1991); this is particularly the case in areas of smaller scale

and mosaic farming systems, typical of many mountain regions (Baldock *et al.*, 1996). While the early successional stages following abandonment bring about an increased landscape heterogeneity – especially when the previous landscape was characterised by large patches of open land – the final stages lead to an increasing mosaic homogeneity and a monotone landscape dominated by forests (Farina, 1991).

Indeed, a particular concern in many upland regions is the closure of the landscape due to the increasing dominance of forests. This process raises several concerns related to the loss of open landscapes, including the visual aspect, the loss of a recreation resource and a broader impression of rural decline (Baldock *et al.*, 1996).

Furthermore, cultural landscapes are important elements of social identity and contribute to political cohesion; mountain landscapes in particular are increasingly understood as a specific living space highly dependent and shaped by the economy, regional values, identity and strategy (Dax and Hovorka, 2004).

The crucial role of landscape appearance can be better understood when considering how important changes in the landscape might have an impact on landscape perception by local people. Indeed, land abandonment and landscape degradation may stimulate a positive feedback mechanism: studies revealed that in some areas local people, and especially elders, conceive the landscape resulting from farmland abandonment as forgotten, even unsafe, far from their traditional concept of "homeland" (Hunziker, 1995, Höchtl *et al.*, 2004). This means that the more the landscape is neglected, the more it is unattractive, the less it arouses positive attitudes towards it. This might be true for young people as well: a re-wilded, impaired and inaccessible landscape hardly inspires a feeling of responsibility towards a certain territory among young people, who might not be particularly fond of it, once the former heterogeneity and variety of features and structures which used to prevail in the landscape have disappeared.

Anyhow, it has to be taken into account that landscape perception differs significantly depending on cultural and social interpretation of the physical changes (Guillot *et al.*, 1998) and it is strongly driven by interests and knowledge about a subject (Nohl, 1990). We may even hypothesize that the homogenisation and "banalisation" of the landscape, i.e. the loss of its typical features, may cause a lacking sense of territorial identity, which in turn can act as a *push factor* for people to move.

On the other way around, the concept of rootedness to geographical places does not express itself only through the networks and interpersonal relationships which somehow link an individual to his/her own territory (see Paragraph 4.4), but it also has to do with a kind of close

bond of affection with one's land. This, in turn, is connected with the sense of belonging to a territory and eventually influences the level of land care provided.

Even though education and training might be determinant in developing environmental awareness and attention towards natural resources conservation, the relationship between local communities and the territory where they are settled has a strong impact in determining the land care provided by the communities themselves. The former line usually rises from outside, thus it somehow characterises a sort of top-down approach: either the scientific community or well established environmentalist organisations convince policy-makers of the urgency of implementing certain actions in order to protect or restore patterns of threatened natural resources in a given area; then, decision-makers might deliberately put into operation a set of policy measures aimed at conserving natural resources. Although this process can be influenced or even driven by powerful local intellectual communities, this does not necessarily mean that it is also well rooted in the local society as a whole.

On the other hand, when a kind of devotement for the territory together with its main and most evident expression, i.e. landscape, is spread both at community and individual level, land care is simply a consequence of such an attitude, while official policy measures targeted to landscape maintenance might even become unnecessary. Land care, which somehow implies landscape maintenance, is first of all perceived as a social duty and an ineludibly commitment by each individual of the community, but also as a pleasure, even an act of love towards one's own land.

As regards the expression "landscape maintenance", it is important to clarify that landscape is not meant at all as a fixed, untouchable, still structure, which needs to be protected against any form of modernisation or even evolution. Rather, landscape is a fully dynamic concept, which cannot be frozen in a given state. However, what might be discussed is the extent to which we should let it evolve according to the most important changes taking place on the territory. An abrupt and unplanned landscape change, as it is occurring in many mountain areas throughout the industrialised countries, often implies irreversible losses of cultural and natural heritage which, in contrast, would deserve to be safeguarded and maintained for the generations to come. Indeed, cultural landscapes in mountains can be kept stable only by continuous farming suited to local conditions (EEA, 1999a).

However, as for habitat variety, also landscape perception differs significantly, whether vegetation re-colonisation takes the form of vast homogeneous forest patches or open meadows and fields continue to dominate the landscape structure. According to some general theories in

landscape preference research, confirmed by specific, interviews-based field studies, a partially reforested land characterised by an intermediate level of landscape heterogeneity usually receives the highest preference (Hunziker, 1995; Kienast *et al*., 2005). Generally, an increased uniformity or homogeneity of the landscape is considered a deterioration in overall landscape quality (Baldock *et al.*, 1996), since a monotone landscape is usually experienced negatively (Hunziker, 1995).

On this subject, an European project coordinated by the Macaulay Land Use Research Institute (MLURI) and titled "VisuLands – Visualisation tools for Public Participation in the Management of Landscape Change" is trying to assess landscape preferences by running a "Landscape Preference Survey" where people are invited to assess some virtual landscape representations. People are requested to choose among nine virtual landscapes, differing mainly for woodland extension and shape (geometric and harsher or curve and smoother edges). The survey is being conducted through both postcard distribution (see Figure 6.4) and on-line, at the web page www.macaulay.ac.uk/landscape-preferences-survey.

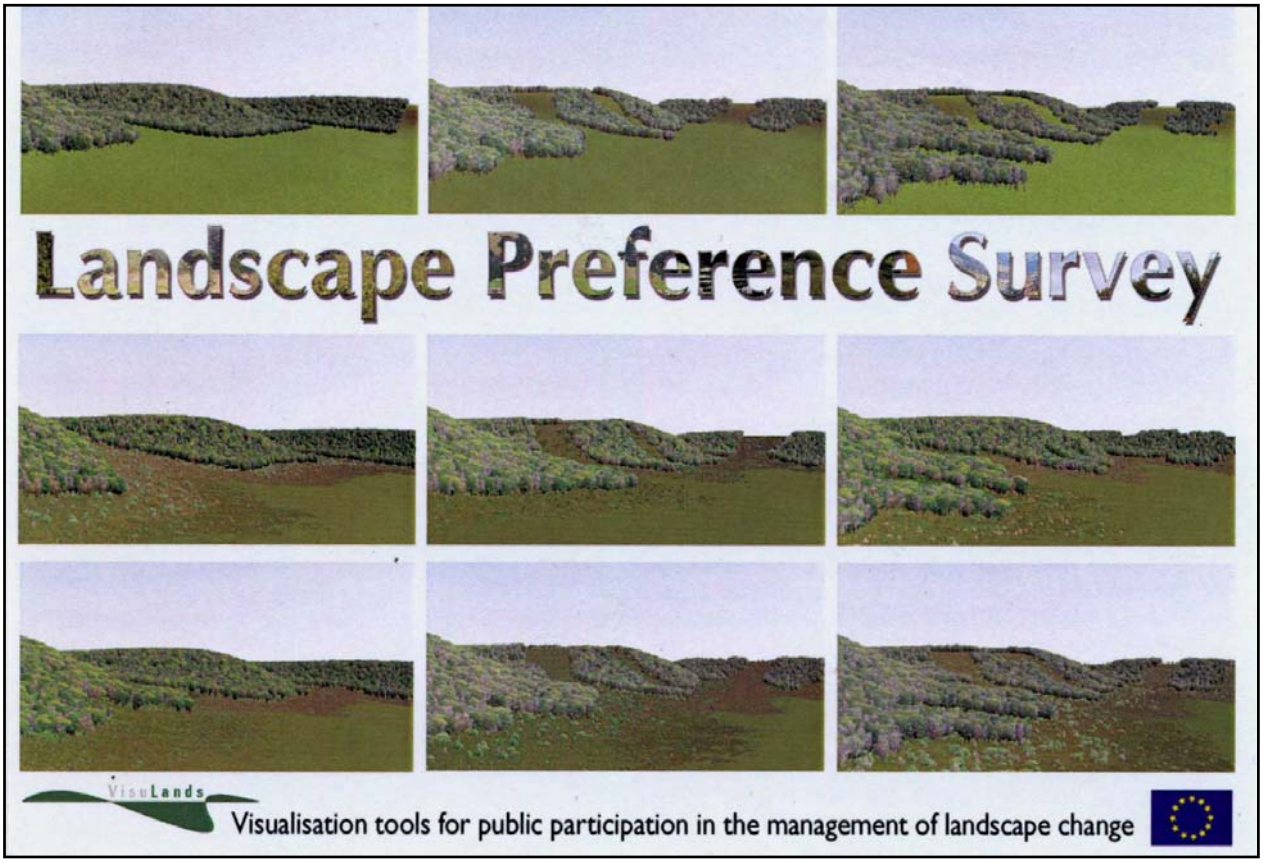


Figure 6.4 – Postcard utilised for the Landscape Preference Survey within the VisuLands project

Although the project is still in progress, some preliminary results seem to confirm the already mentioned general theories on landscape perception, emerging a preference for a medium degree of forest patches' extension, possibly characterised by "natural", i.e. non linear, borders (Miller and Ode, personal communication, 2005).

The topic of landscape preferences and stakeholders' assessment of landscape change has been developed also by the Swiss Federal Research Institute, Section Landscape and Society. A recent survey has been conducted within the project *BioScene: Reconciling conservation of biodiversity with declining agricultural use in the mountains of Europe*, in which the visual impact of three different scenarios of land-use change for the year 2030 has been assessed by six stakeholder panels across Europe. Among the three proposed scenarios ("business-as-usual", "liberalisation" and "managed change for biodiversity"[1]), the most appreciated among the interviewed was "managed change for biodiversity", although the reasons for its prioritising were different in the different countries where the survey has been conducted.

In Switzerland, for example, although the landscapes associated with the "managed change for biodiversity" scenario have been appreciated from a purely visual point of view, the scenario "business-as-usual" was preferred as a whole, i.e. when considering also its livelihood, while the "liberalisation" scenario, which implied the loss of the typical Swiss mountain landscape, arose concerns especially among people employed in the tourist industry, since landscape is one of the main Swiss tourist assets and any change is seen negatively. Moreover, also the increased risk of natural hazards deriving from abandonment was recognized by the Swiss stakeholders, together with the loss of territorial identity (Soliva and Ronningen, 2005).

Contrary to what proofed by the overwhelming majority of the studies on this topic, including those undertaken by the Institute itself, according to another survey conducted by the Swiss Federal Research Institute the majority of visitors invited to choose among four different scenarios ("traditional", i.e. how the Swiss landscape looked like at the beginning of the 20th century, "intensive", "afforestation" and "status quo") seemed to prefer the "afforestation" scenario, although the level of preference rating decreased after conducting some experimental consensus-building procedures during which people were made aware of the various aspects connected with forest expansion (Hunziker *et al.*, 2005).

[1] The "business-as usual" scenario relies on the trends of land-use change observed during the last 20 years; in the "liberalisation" scenario no public support is given to agriculture and conservation, thus leading to the free evolution of marginalisation trends, i.e. land abandonment and afforestation at higher elevations and intensification of open land in the lowlands; the "managed change for biodiversity" scenario assumes optimal management strategies and subsidies for biodiversity and conservation, converting large proportions of currently intensively managed land into non-intensively used meadows, and re-afforestation is usually marginal (Kienast *et al.*, 2005; Bolliger *et al.*, 2005).

Figure 6.5 – Evidence of disregard: in Gjaverissino (Province of Udine, Italy) the ruins of a former rural building are nowadays completely invaded by vegetation while secondary woods took the place of the meadows and pastures which used to surround the building. Source: Candido, 2004

Anyhow, aesthetic and psychological perception of land use changes varies considerably among residents and external visitors: local people, and especially elders, usually conceive the resulting landscape as dirty and scruffy (Hunziker, 1995; Höchtl *et al.*, 2004) (see Figure 6.5). This might be mainly due to the fact that local people are usually more aware of the negative impacts of land use changes, especially in terms of increased natural hazards and economic losses. Moreover, they know that such a forest expansion has been taking place in recent times, while landscape looked very differently just a few decades ago. On the contrary, visitors are often unaware of the radical changes occurred and as a consequence they commonly experience the new scenery as highly *natural*, untouched even. External visitors, urban people in particular, might enjoy a positive emotional feeling of *wilderness* associated with reforested lands, when ignorant about the former landscape and the losses caused by its evolution. On the other hand, the informed visitors regret the loss of cultural landscape and social heritage caused by land use changes (Höchtl *et al.*, 2004).

Nevertheless, the decline in the landscape accessibility, the progressive impenetrability of the territory and the deterioration of the network of pathways affect the possibility to experience nature, thus resulting in an undesirable effect from a tourist point of view. The development of a higher vegetation, for instance, often causes the closure of viewpoints, thus decreasing enjoyability of landscape by visitors.

The minor accessibility also affects exploitability of the territory by local people, not only for recreational purposes but also in terms of collecting wood or non-wood forest products. In Italy, for example, the exercise of the so-called *usi civici* is threatened, which consists in the residents' right to make use of certain local resources, such as gathering firewood. Moreover, also the possibility to protect the territory by controlling its proneness towards certain natural

hazards, such as landslides and fires, is under threat. Occasionally anxieties and concerns have been observed among local populations due to such threats posed to villages (Höchtl *et al.*, 2004).

Therefore, we may say that both local people and visitors experience spontaneous afforestation in an ambivalent way, though for local people a negative perception prevails. The perspectives by different stakeholders as regards spontaneous afforestation, according to Piussi and Pettenella, are summarised in Table 6.1.

Stakeholders	Aspects taken into consideration	Consequent evaluation
Local (elderly) inhabitants	Landscape structure	Negative: loss of heritage values related to traditional land use pattern
Local (young, non farmers) inhabitants	Landscape structure	The "wild" environment may be perceived as a positive aspect
Local farmers	Farm productivity	Generally negative: loss of valuable agricultural land
Tourists	Landscape quality	Often negative, if forest coverage is too high and other land use forms are missed; non-wood forest products collectors may have, however, an opposite evaluation
Environmentalists	Species and ecosystems diversity and richness	Diverse evaluation: the loss of diversity may be compensated by an increased "naturality" of the environment
Local politicians	Employment and gross value production	Generally negative: conversion of agricultural land means labour extensification and reduced land productivity
Forest workers and wood industry	Timber market	Positive larger forest areas increase wood supply
People directly involved in fire fighting	Forest fire risk and related possible damages	Positive, if fires are a source of employment: unmanaged transitional forests are frequently interested by fire events
Urban citizens	Presence of untouched, natural environments	Positive: increased natural area represent a sort of compensation to the polluting, artificial urban environment

Table 6.1 – Public perception of spontaneous afforestation processes. Source: Piussi and Pettenella, 2000

6.4 – Economic impacts

Economic impacts caused by land abandonment are by far the less well studied. From a qualitative point of view, several economic impacts might be identified, most of which have been already mentioned while describing social and environmental impacts, such as the damages caused by natural hazards (see Figure 6.6), the more limited exploitability of the territory due to the rising inaccessibility of unmanaged secondary forests, the depletion of game species, particularly those belonging to the avifauna, and the loss of remarkable and highly appreciated landscapes, of outstanding importance for tourist industry. In addition to that, other impacts have to be taken into account, such as the loss of pastures and hay meadows meant as productive resources.

Figure 6.6 – Natural hazards such as landslides caused by increased slope instability are among the main environmental and economic impacts of land abandonment

Yet, these impacts have hardly been assessed from a quantitative point of view, mainly because they are obviously extremely difficult to evaluate.

Among them, the damages caused by increased natural hazards to human settlements, infrastructures and activities are probably the most significant and easier to calculate, even though the potential risks are hard to estimate. In Switzerland, for example, long lasting investigations on the phenomenon of spontaneous afforestation on abandoned farmland inferring a negative evaluation of the process, especially in terms of increased natural hazards, led to the introduction of financial incentives aiming at inhibiting old-field succession (Hunziker, 1995).

Figure 6.7 – In Val Visdende (Province of Belluno, Italy) mountain farming practices contributed to shape remarkable landscapes, which represent the main tourist asset for Alpine regions

On the other hand, losses of biodiversity and cultural landscapes are by far the most difficult to evaluate.

In the latter case one possible, although partial, way to assess such an economic value is based on the above mentioned change in landscape perception among residents and tourists (see Paragraph 6.3).

In particular, the role of cultural landscapes as tourist asset has to be considered. Although it is difficult to estimate what economic contribution cultivated landscape and the related cultural diversity make to the development and continued existence of the Alpine tourist industry, because of the many indirect relationships and side-effects, it may be affirmed that agriculture and tourism are closely connected by interdependence and mutual usufruct (OECD, 2002) (see Figure 6.7).

Summer tourism in particular is related to the quality of residential areas and cultivated landscapes, although the maintenance of ski slopes is also facilitated by cattle and sheep grazing.

Two interesting studies have been recently undertaken in Austria by the Organisation for Economic Co-operation and Development (OECD), aiming at evaluating biodiversity, landscape and ecosystem services provided by agriculture and forestry, with particular regard to the role of rural amenities of cultural landscape (OECD, 1998 and 2002).

As regards tourism, the results of a survey aimed at valuing the agricultural landscape in Austria indicated that 84% of tourists regarded a "well-kept" landscape as the decisive factor in visiting Austria and 88% selected "environment and countryside" from a list of 26 possibilities as the component rated to be the most important at the tourist resort; while in the sample as a whole two-thirds of respondents indicated that farmers should provide landscape-related services, this figure was highest at 70% for Austrian respondents, who also indicated the highest Willingness-To-Pay (Pruckner, 1995).

Therefore, tourism in Austria is mainly based on the generally high quality of the cultural landscape as rural amenity (Hovorka,1998). The close connection between agriculture and tourism – the value-added share of which in the total GDP amounted to approximately 8% in 1995, while the Alpine area accounted for about 85% of overnight tourist stays in Austria (*ib.*) – represents one of the reasons why this country developed an impressive system of financial support to mountain farming (see Chapter 9). In addition to that, also some local municipalities with large presence of tourists are available to pay additional alpine husbandry and mowing premiums to local mountain farmers in order to prevent the experience value from being lost by neglecting the natural surrounding (OECD, 2002). Indeed, the process of spontaneous afforestation following land abandonment would cause the disappearance of those typical features of cultural landscape which nowadays provide a fundamental experience value, which in turn is essential to the entire tourist industry and its development (*ib.*).

Landscape change not only provokes different emotions, but potentially inhibits tourist experiences as well, by limiting the exploitability of the territory due to the increased closure and impenetrability, which reduces the extension and frequency of open spaces to be utilised for recreational purposes, and makes the state of the network of pathways worse (see Paragraph 6.3). As a result of increasing inaccessibility, tourism would not be able to play a decisive role in the development of affected communities, and environmental education and recreation would hardly be possible (Höchtl *et al.,* 2004).

In addition to the experience value, also the existence value has to be taken into account: a high existence value is actually often attributed to cultivated landscape shaped by traditional agricultural and forestry practices especially by the local inhabitants, as this sustainable way of using nature was logical and fundamental in the past. Along with mountain population, also Austrian community as a whole is strongly concerned about the maintenance of typical mountain cultural landscape, which also implies a high level of acceptance for mountain farming support (Hovorka, 1998; Hopplicher, personal communication, 2005).

This is due to social, environmental and economic reasons, such as:

- the compensation for more difficult farming and living conditions and the poverty level which used to affect rural mountain areas even in the recent past (*ib*);
- the highly developed environmental awareness and the consequent support for ecological orientation of agriculture (84% of Austrian population is in favour of the Austrian government pursuing environmentally friendly forms of agricultural production) (Hovorka, 1998);
- a strong concern about the economic impacts caused by farmland abandonment, particularly in terms of increased risk of natural hazards and the consequent rising costs for protection and restoration (Hovorka, 1998; Hopplicher, personal communication, 2005).

Yet, although landscape is commonly meant in environmental economics as important primarily for its visual characteristics, cultural landscape might be seen as being concerned with more than just the physical appearance of mountain areas, rather encompassing the economic activities and social structures that are associated culturally and historically with the use and life within the mountain areas (Hodge, 1998). If this point of view is adopted, then further direct and indirect economic consequences of land abandonment affecting mountain landscapes are identified: among those, economic losses related to the decline of extensive grazing practices are particularly important.

Secondary pastures represent a unique and precious combination of natural and anthropogenic efforts, being the outcome of a historical co-evolution between humans and environment. Pastures usually result from an initial deforestation, followed by continuous interventions aimed at containing forest encroachment (Ziliotto *et al*., 2004), also hindered by summer animal grazing.

For this reason abandonment of alpine pastures often results in an irreversible loss, both for economic and for cultural reasons: together with pastures a whole traditional knowledge and the connected cultural and social heritage disappear.

Once the know-how has been forgotten, a recovery is extremely difficult, if not impossible. Functional links between parts of the mountain territory situated at different altitudes and reflecting a more sustainable exploitation of local resources (e.g. land use structures connected with the alpine transhumance) vanish, together with the relative cultural values (Piussi and Pettenella, 2000). Even the physical restoration of pastures is an onerous process, costly and time-consuming.

Hay meadows and pastures are thus to be seen not only for their role as cultural heritage and valuable habitats hosting a various biodiversity, but also as economic resources, which are necessary for the production of certain high quality dairy products. This topic is of particular relevance when considering the recent tendency towards a re-establishment of summer extensive mountain grazing, thanks to the greater role acquired by organic and typical products on the market, the latter in particular through the European labels PDO (Protection of Designations of Origin) and PGI (Protection of Geographical Indications), as well as to the national and European financial subsidies aimed at preserving those pastures not yet totally abandoned (*ib.*).

Such a trend, although marked even earlier, recently grew considerably following up events such as the Bovine Spongiform Encephalopathy (BSE), or mad cow disease, and the Foot and Mouth Disease[1], which enlightened the negative consequences caused by highly intensive cattle breeding systems and the unnatural rhythms and conditions they impose to animals (Moriconi, 2001).

A slight increase in suckler cows in particular can be observed in mountain grassland areas, thanks to the BSE crisis and the corresponding consumer reactions and increased demand for high quality beef (Knickel, 2000).

[1] Bovine Spongiform Encephalopaty (BSE) or mad cow disease is a chronic, degenerative disorder affecting the central nervous system of cattle, while Foot and Mouth Disease, affecting cattle, pig, sheep and goats, is one of the most contagious animal disease, thus implying important economic losses.

Land value significantly decreases following its abandonment, both because of the diminishing accessibility and exploitability of the territory and because of the lower productive value. On this purpose, even intermediate stages within the abandonment process might be affected by economic damages: it has been observed that, in case of insufficient grazing pressure, highly competitive but scarcely palatable or even toxic, harmful vegetal species become dominant, finally resulting in a poorer quantity and/or quality of milk and its by-products (Baudry and Asselin, 1991; Höchtl *et al.,* 2004). Moreover, once an area has begun to suffer from neglect and abandonment, the agricultural and social infrastructures deplete, and farming becomes increasingly difficult for those remaining, thus reinforcing the cumulative process of decline (Baldock *et al.*, 1996).

Undergrazing can therefore be expected to ultimately result in a decline in grazing value itself, finally leading to a further running down of zootechnical activities and to the complete desertion of mountain pastures (Brouwer *et al.*, 1997). A sort of positive feedback mechanism thus begins after the first signs of abandonment occur, by which from an initial running down of farming activities, namely grazing, the situation evolves towards the complete farmland abandonment, mainly due to the loss of productivity and viability of undergrazed systems (see Paragraph 4.2).

Along with the negative economic impacts, there are also some positive economic effects, in particular those associated with forest expansion, namely the importance of new woods in the timber market, together with their role as "sinks" for carbon sequestration. Yet, the efficiency of secondary forests to these regards is usually overestimated.

For instance, the contribution of new forests to market timber is only marginal, given the very poor quality of the timber potentially resulting from new forests deriving from re-wilding processes, especially if unmanaged. Moreover, it is useful to remind that mature forests and even old plantations are nowadays no longer economically viable and therefore abandoned in most of Italian Alps, due to the harsh topographic constraints and the strong competition played by other European countries (see Paragraph 8.1).

As regards the role of secondary forests as sinks, it is important to refer once again to their degree of management: if spontaneous afforestation evolves without any control towards wild and unmanaged secondary forests, it is then very likely that the fast growing phase – which is the life stage characterised by the highest degree of carbon sequestration – will last just for a short time, and the process of carbon sequestration will thus slow down soon.

Moreover, since wild fires are more likely to break out in this kind of vegetation cover, the carbon which has been absorbed returns to the atmosphere as carbon dioxide in event of fire.

On the contrary, in cultivated secondary forests the successional process is monitored and controlled, so that trees are felled immediately after completing their growing stage. This both allows the removal of the sequestrated carbon, which is thus prevented by re-entering the circulation, and lets trees renovation, by which the growing process is able to continue (Del Favero, personal communication, 2005). Yet, above all it is important to bear in mind that unplanned forests resulting from unintentional, spontaneous renovation are not counted as carbon credits, which only comprise plantations (Ciccarese and Pettenella, 2005).

Therefore we may affirm that abandonment of traditional farming activities results in a number of impacts, which can be summarised as follows (see Table 6.2): increased natural hazards; loss of productive land; diminishing terrain value; loss of natural capital and environmental quality; depletion of environmental services; loss of open or otherwise accessible spaces suitable for various purposes such as tourist, recreation and sport activities; loss of local cultivar and typical products; diminished habitat variety and biodiversity; decline of traditional lifestyles and knowledge; permanent loss of cultural landscape; loss of cultural and social heritage and identity; decline of the human presence, and the consequent land care and control, in the mountains.

Most of these impacts determine potential and real income losses that are somehow quantifiable, while some others belong to the sphere of ethics and moral values, thus being extremely difficult to estimate. Moreover, as previously mentioned, it is not always possible to determine whether each of these impacts is positive or negative in absolute terms: such an assessment is made even more difficult where different interest groups may interpret impacts differently. Hence, deeper investigations are needed on these themes, since the present state of the research seems not to cover enough such a significant and broad issue affecting most of the mountain territories in industrialised countries.

An economic evaluation would be useful also in order to assess the opportunity to provide financial support to mountain farming, as well as the effectiveness of the subsidies supplied, e.g. in terms of prevention of natural hazards, fulfilment of social expectations or maintenance of environmental services.

SOCIAL IMPACTS	ENVIRONMENTAL IMPACTS	ECONOMIC IMPACTS
Disappearance of important features of **cultural landscapes**, such as pastures, hay meadows and small plots of cultivated fields	Loss of **semi-natural open habitats** caused by the running down of *High Nature Value (HNV)* farming systems	**Damages** caused by natural hazards
Depletion of **natural and cultural heritage** (empirical knowledge and skills)	**Biodiversity depletion** affecting: • Species adapted to semi-natural habitats • Species living in transitional habitats • Species needing open spaces	**Loss of** remarkable and highly appreciated **landscapes** (rural amenities as tourist asset)
Homogenisation and **closure** of the landscape	**Slope instability** and increased risk of **natural hazards** (snow gliding, landslides, avalanches, wild fires)	**Game** species depletion (avifauna)
Change in **landscape perception**: • by ***residents*** (influence on land care provided by local communities) • by ***visitors*** (aesthetic value of the landscape)	**Microclimatic changes** due to forest expansion	Rising **inaccessibility**, smaller exploitability of the territory
		Loss of pastures and hay meadows as **economic resources**

Table 6.2 – Main impacts caused by farmland abandonment and the consequent forest expansion

CHAPTER 7 – RESPONSES

7.1 – Overview of the main currently available policy tools

The issue of marginalisation of European rural areas, with regard to its social and economic aspects, has been largely recognized and partially faced by the EU institutions since 1975, through the development of the *Less-Favoured Areas* (LFAs) scheme, at a time when the scope of the Common Agricultural Policy (CAP) expanded, from the unique objective of regulating production, towards the maintenance of farmers in areas considered as being at risk from depopulation and abandonment[1]. The compensation of handicaps was the key argument for the measures taken, such as the support for infrastructure and investments as well as subsidies for grazing.

However, the implementation of the initiatives was left open to the individual Member States (see Paragraph 2.1), who adopted rather different delimitations of their mountain area and implemented a great diversity of approaches in very contrasting way. Member States were required to identify certain areas used for mountain and hill farming or other less-favoured areas defined by natural physical handicaps, and in particular altitude, slope, infertility or low productivity of the environment. Direct income payments could be made to farmers within these LFAs for the continuation of farming, thereby maintaining a minimum population level and conserving the countryside.

Before the 2004 enlargement, fifty-six per cent of the EU Utilised Agricultural Area (UAA) came within the delimitation of less-favoured areas, and of this a substantial amount was classified as mountain areas (MacDonald *et al*., 2000). Since 1975, the Less-Favoured Areas Directive 75/268/EC has been followed by a number of Regulations, such as Reg. 2078/92 and Reg. 950/97, later repealed by the Council Regulation No. 1257/1999 of 17 May 1999 "on support for rural development from the European Agricultural Guidance and Guarantee Fund (EAGGF)".

Financial measures such as subsidies, incentives or compensation payments represent the main tools so far adopted by European Union, as well as by national and regional governments,

[1] Dir. 268/75 states that "*the less-favoured farming areas shall include mountain areas, in which farming is necessary to protect the countryside, particularly for reasons of protection against erosion or in order to meet leisure needs; they shall also include other areas where the maintenance of a minimum population or the conservation of the countryside are not assured*" (art. 3).

in order to counteract marginalisation trends and land abandonment. However, such processes have been sometimes even accentuated by the Common Agricultural Policy (CAP), which encouraged intensive productive systems in the lowlands, thus indirectly penalising less competitive, extensive farming practices in the uplands, typically associated with high nature conservation interests.

On the other hand, structural or regional programmes specifically aimed at combating depopulation and land abandonment in mountain areas often led to intensification and overexploitation of natural resources. Financial subsidies, especially when productive – oriented, promoted the intensification process of farming activities, in particular in those areas characterised by favourable climatic and natural conditions, thus conflicting with agri-environmental measures firstly introduced under the 1992 CAP reform and aiming at providing support for extensive farming systems (Caraveli, 2000; Dax and Wiesinger, 1997).

Presently, the maintenance of low-intensity systems is broadly recognized as a priority for both social and environmental purposes. Reg. 1257/99, Article 22, states that agri-environment support "*shall promote an environmentally-favourable extensification of farming and management of low-intensity pasture systems*", together with "*the conservation of high nature-value farmed environments which are under threat and the upkeep of the landscape and historical features on agricultural land*" (CEC, 1999). Compensations are thus justified by the outstanding role of mountain farming in providing essential services and preserving downstream interests, which are not comprised within agricultural products' market prices.

Nevertheless, the provision of subsidies through the CAP is not the only way in which the EU is trying to cope with the phenomenon of land abandonment. Some Community Initiative Programmes such as the LEADER and INTERREG, for instance, have significantly contributed to revitalise marginal mountain areas at local level. Finally, a third way is given by the protection of those areas whose high natural value is menaced by neglect and abandonment. Significant on this purpose is the Council Directive 92/43/EEC "on the conservation of natural habitats and of wild fauna and flora" (the so-called *"Habitats Directive"*) and the consequent creation of the *Natura 2000* network. There are, of course, other kinds of initiatives than policy measures which have been implemented in order to counteract land abandonment, including rural and agri-tourism development and marketing of typical local products and organic farming, aiming at adding value to labour intensive farming practices. Yet, even these actions are somehow related to those policy measures aimed at promoting or strengthening them, such as the agri-environment scheme.

The analysis of the society's responses has thus been limited to the main policy tools currently available at European level. They have been classified according to what they influence the most among driving forces, pressures, state or impacts as regards the phenomenon of farmland abandonment (see Figure 7.1). More precisely, CAP first pillar measures have been identified as contributing to determine in particular the factors at the origin of marginalisation, i.e. driving forces (A). On the other hand, CAP second pillar measures, i.e. rural development measures, have been considered important in exerting their influence on intensification and extensification processes, i.e. pressures (B). Finally, nature protection measures mainly act directly on the state of the environment (C_1) and the impacts (C_2) caused by farmland abandonment and the consequent forest expansion. Let us now consider these three groups more into details, focusing in particular on the Common Agricultural Policy.

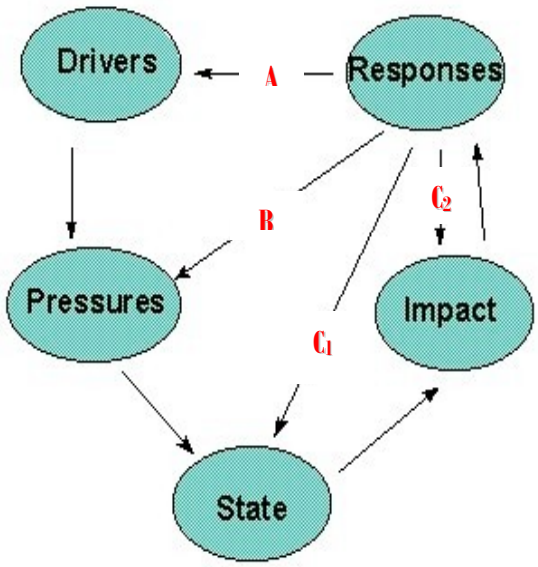


Figure 7.1 - The DPSIR framework for assessment and reporting. Source: EEA, 1999b

7.2 – Evolution of the Common Agricultural Policy: from a productive oriented tool to the support of High Nature Value farming systems

While the policy priorities for reversing land abandonment are environmental, social and economic, the policy tools to achieve these are almost entirely within the Common Agricultural Policy (Keensleyside et *al.*, 2004). Indeed, the CAP is the most significant driver amongst the policies that affect land use and people being developed or implemented by the EU, national and regional governments.

The Common Agricultural Policy (CAP) was adopted through the *Treaty establishing the European Community*, the so-called *Treaty of Rome*, which brought the European Economic Community into begin in 1957. In particular, Part III, Title II of the Treaty establishes a common market for agricultural products and sets out the CAP main objectives in art. 39 as follows (European Communities, 1957):

- to increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimum utilisation of the factors of production, in particular labour;
- to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture;
- to stabilise markets;
- to assure the availability of supplies;
- to ensure that supplies reach consumers at reasonable prices.

As a matter of fact, these objectives remained substantially unchanged until 1992. The CAP was then principally oriented on two aims: targeted agricultural production to market needs (*guidance*) and maintenance of farm incomes (*guarantee*). Quite obviously, the Treaty of Rome did not mention the environment at all, since the main priority at that time was to increase agricultural productivity (Brouwer and Lowe, 2000). Environmental protection was acknowledged as an objective of the CAP for the first time in 1992, with the so-called Mac Sharry reform, even though this was not the main objective of the reform.

Since 1992, the CAP was completely changed through three radical reforms. Apart from the Mac Sharry reform, also a whole round of reforms took place from 1997 to 1999, which was part of Agenda 2000. Finally, the mid-term review of 2003 gained the character of a proper reform for the significant changes introduced and it is also referred to as "Fischler reform", from the name of the then EU Agriculture Commissioner.

The 1992 CAP reform has been characterised as a turning point in the movement towards an ecologically sounder and environmentally friendlier policy (Brouwer and Lowe, 2000). Inverting the previous trend, the 1992 reform included measures intended to reduce surplus production and price support, while strengthening the environmental element in agricultural policy. Since then, the CAP has been better coupled to EU structural policies, stressing environment and cohesion, with increasing emphasis on non-market oriented measures.

These new tasks were implemented through the establishment of three so-called "accompanying measures", namely aid for early retirement, afforestation of agricultural land and agri-environment. These measures were set out respectively by Reg. 2079/92, Reg. 2080/92 and Reg. 2078/92, which imposed an obligation for all Member States to draw up agri-environmental programmes within a specified time frame.

Agri-environmental measures were not completely new within the EU legislation: Reg. 797/85, for instance, had already authorised Member States to introduce special national schemes in environmentally sensitive areas, i.e. "*areas of recognized importance from an ecological and landscape point of view*". However, the Mac Sharry reform covered a wider range of agricultural activities and strategies of agricultural development and allowed a significant increase in the amount of funds made available for this kind of measures, by co-financing it by the Guarantee Section of the European Agricultural Guidance and Guarantee fund (EAGGF), rather than the Guidance Section, as it used to be under the previous legislation.

On the broad terms, Reg. 2078/92 contained two objectives: one concerned reduction of the *negative* impact of agriculture on the environment by lessening the use of chemical products and adoption of eco-compatible practices, while the other was aimed at compensating farmers for the *positive* management connected with countryside stewardship and environmental conservation. The measures related to the former objective were needed mainly in the more fertile areas, while those aimed at environmental conservation were mostly implemented in more marginal and unfavourable areas. The introduction of the second objective was highly significant, because it recognized the importance of positive externalities provided by certain agricultural practices in environmental terms.

Yet, not every member country comprised the significance of such an innovative approach. In Italy, for instance, Reg. 2078/92 was basically used as an instrument to reduce the negative impacts of intensive agriculture on the environment, while the value of traditional labour intensive agricultural practices was less recognized.

The increasing awareness of the value attached to cultivated landscapes, semi-natural habitats and bio-diversity created the need for rural policies ensuring the continuation of appropriate methods of farming and the provision of related environmental services (EC, 1997). Therefore, since the Mac Sharry reform, two different principal forms of support within the CAP, later known as "pillars", started to emerge: market support and direct payments available to nearly all farmers, also referred to as "market measures" or "pillar one" payments, on the one hand, and a range of selective payments for rural development measures comprised within the so-called "pillar two", on the other hand. In particular, the accompanying measures, such as the agri-environment scheme, were to be included into the second pillar.

The Agenda 2000 incorporated a fourth accompanying measure, in addition to those provided by the previous reform, namely compensatory allowances for less-favoured areas and areas subject to environmental constraints, which had been firstly introduced by Directive 75/268/EC (the so-called LFAs Directive) and later incorporated into Reg. 797/85, which was itself replaced by Reg. 2328/91 and finally by Reg. 950/97. Under the Agenda 2000 agreement, LFAs measures thus became an integral part or rural development. In particular, Chapter V of the so-called Rural Development Regulation, i.e. Reg. 1257/99, refers to "less-favoured areas and areas with environmental restrictions"[1], containing fundamental changes to the previous legislation.

In particular, the less-favoured areas measure under Council Regulation (EC) No 1257/99 is limited to one instrument, i.e. the payment of compensatory allowances to farmers in less-favoured areas. Moreover, since headage payments, i.e. payments based on the number of Livestock Units (LU), had led to the intensification of farming practices, causing negative environmental impacts, under the new arrangements headage payments were replaced with an area payment scheme, with the objective of encouraging more extensive livestock production[2].

New conditions were also applied, so farmers receiving compensation payments within the LFAs were obliged to respect certain environmental standards, defined by the so-called Good Agricultural Practice (GAP) code, to be set by each Member State.

Finally, Member States were allowed to differentiate the amount of payments received by farmers: this gave scope for allowing different premiums for different regions, the severity for handicaps, particular environmental problems and type of production system (Baldock *et al.*, 2000). The significant novelty introduced by Reg. 1257/99 is thus the inclusion of environmental concerns into the criteria for providing compensatory allowances to farming in less-favoured areas, which is thus recognized not just for its social value, but also for environmental purposes. From a nature conservation perspective, the Agenda 2000 changes are important also because of the biological and landscape value attributed to the LFAs farming systems, which adapted to local conditions over time, thus contributing to determine favourable habitats for wildlife.

[1] Art. 19 specifically refers to LFAs in danger of abandonment of land use as *"farming areas which are homogeneous from the point of view of natural production conditions"* and exhibit certain characteristics such as the presence of poor land of appreciably lower productivity than the average and a low or dwindling population predominantly dependent on agricultural activity.

[2] Under the previous legislation subsidies were greatest on farms with the largest number of livestock units and in regions with the most fertile and more intensively farmed arable land, thus the support system rewarded those producers who had taken steps to increase their animal stocking densities. As a consequence, in certain Member States, such as the UK, Ireland, Spain and partly Italy and Greece, the LFAs support system had been associated with considerable increases in livestock numbers (Beaufoy *et al.*, 1994).

There seemed to be two main reasons behind the changes regarding LFAs support. First was the need to make LFAs support a more environmentally sensitive policy: the aim was actually to continue support for farmers in areas with marginal economic farms, but at the same time to sustain positive land management and to reduce the negative effects of farming. A second reason for change was to weaken the link between production in the LFAs and the support system, by moving from headage to area payments and starting to "decouple" support from production.

Agenda 2000 thus represented a deepening and an extension of the 1992 reform for market policy and the consolidation of rural development as the "second pillar" of the CAP (EC, 2002), placing integrated rural development measures on an equal footing with direct and indirect mainstream support. The reform was aimed at more market orientation and increased competitiveness, food safety and quality, stabilisation of agricultural incomes, integration of environmental concerns into agricultural policy, developing the vitality of rural areas, simplification and strengthened decentralisation (*ib.*).

The rural development policy, as laid down in Council Regulation (EC) No 1257/1999, allowed for payments through the second pillar via various measures, such as investments in agricultural holdings (e.g. for improvements regarding the environmental and animal welfare aspects on farms), setting up of young farmers, farmers' participation in quality schemes and promotion of their products, training, processing and marketing measures and agri-environmental measures, apart from the already mentioned compensatory payments in less-favoured areas. A list of 22 measures was put at the disposal of the Member States, who could choose those measures best responding to the needs in their rural areas.

The measures can be regrouped into the following broad categories:

- investments in farm businesses;
- human resources (installation of young farmers, early retirement, training);
- processing and marketing of agricultural products;
- forestry;
- measures promoting the adaptation and development of rural areas;
- agri-environment measures;
- less favoured areas and areas subject to environmental constraints.

In particular, the last two measures, i.e. agri-environmental programmes and compensatory allowances, which together represent by far the two main instruments of Rural Development Regulation, appeared to be extremely important in mountain regions.

All of the accompanying measures were to be co-financed by the Guarantee Section, thus creating the possibility of large flows of funds into rural development, while the Guidance Section funded the Leader projects, designed to help rural actors to improve the long-term potential of their local regions.

Agenda 2000 and the 2000-2006 regulation have thus reinforced the second pillar, even though just a relatively small proportion of the total funds deriving from the CAP was allocated to rural development measures. Indeed, the budget for these measures did not increase significantly, while it was up to Member States, who were given considerable flexibility in developing schemes, to choose to which scheme allocate more funds.

Nowadays, the EU Agricultural Guidance and Guarantee Fund (EAGGF) comprises of two parts. The Guarantee Section finances expenditure under the policy on prices and markets, but also includes compensatory payments and the other accompanying measures. By far the greater part of expenditure is thus handled by the Guarantee Section. On the other hand, the Guidance Section contains those resources allocated to the structural policy, such as aid for the modernisation of holdings and the installation of young farmers, aid for processing and marketing, diversification and so on. In particular, LEADER+ projects are funded from the Guidance Section. The Guidance Section thus co-finances rural development actions, together with the European Regional Development Fund (ERDF) and the European Social Fund (ESF).

On this purpose, it might be useful to remind that, although being a sectorial policy, about a half of the whole EU budget is allocated for the CAP. Overall EU funding for rural development for 2000-2006 comprises over 50 billion Euros, with 33 billion Euros coming from the EAGGF-Guarantee section and 18 billion Euros coming from the Guidance section. The principal instruments of the CAP are summarised in Table 7.1.

PILLAR ONE	PILLAR TWO
Market support measures	Agri-environmental measures and compensatory allowances for less-favoured areas
Payments coupled to direct or compensation payments for the main agricultural production systems	Structural measures, e.g. support for marketing products, renovation and development of farms and villages

Table 7.1 – The principal instruments of the CAP, divided into Pillars One and Two. Source: Miller *et al.*, 2004

The EU policies of particular relevance to land abandonment have just passed through a period of major change: CAP pillar one has just been reformed by the so-called Fischler reform, while rural development funding has been reviewed by Council Regulation 1698/2005. Let us consider these two crucial policy tools more into details, together with the main changes introduced by the most recent reforms and their effects on land abandonment.

7.3 – Responses influencing driving forces: CAP market measures (Pillar One)

7.3.1 – The responsibility of CAP market measures in fostering intensification and abandonment by determining agricultural marginalisation

Market measures within CAP first pillar strongly influence, both positively and negatively, driving forces leading to marginalisation processes, with particular regard to those factors posing uncompetitive forms of agricultural activities at the margin of economic viability. Although these measures may be also considered for their potential role in enhancing competitiveness of certain extensive forms of agriculture practised in marginal areas, so far they have been mainly responsible for strengthening intensification in more favourable land, thus reducing the viability of agricultural activities in less competitive areas such as uplands.

Intensive production practices have, to a great extent, been largely assisted by CAP price subsidies and other kinds of aids, which concentrate support on the more productive farms, rather than those contributing more to social and environmental goals. As a consequence, the same support measures which induced intensification on the more productive land also induced further extensification and abandonment in less-favoured areas (Caraveli, 2000), thus entering into conflict with those measures which are specifically targeted towards the maintenance of environmentally friendly farming systems the very same areas.

An evident conflict within the CAP thus emerges: while the main part of the CAP, i.e. pillar one, has been working to the disadvantage of LFAs and low intensity farming systems (Beaufoy *et al.*, 1994), rural development measures, such as agri-environmental programmes and LFAs compensatory allowances, direct CAP funds into handicapped and environmentally sensitive areas and are aimed at combating abandonment and marginalisation on both social and environmental grounds (Caraveli, 2000). In addition to that, there have been also cases where structural or regional programmes provided support for intensification in marginal areas, while agri-environmental payments were trying to achieve the opposite.

Hereinafter, both land abandonment and intensification are likely to be even strengthened by the 2003 mid-term CAP review, also known as Fischler reform, which represents the most dramatic transformation of farm aid in Europe since the foundation of the Common Agricultural Policy (Buck and Ortiz de Arri, 2003).

The set of objectives that agricultural and rural development policy should promote, according to the European Commission mid-term review, are (EC, 2002):

- a competitive agricultural sector;
- production methods that support environmentally friendly, quality products that the public wants;
- a fair standard of living and income stability for the agricultural community;
- diversity in forms of agriculture, maintaining visual amenities and supporting rural communities;
- simplicity in agricultural policy and the sharing of responsibilities among Commission and Member States;
- justification of support through the provision of services that the public expects farmers to provide.

As regards traditional production and mixed farming methods, the mid-term review recognized their role in maintaining High Nature Value agricultural systems, landscapes and traditional products, as well as their need for more targeted support to adapt to the opportunities offered by more open markets and consumer demand for quality products (EC, 2002). In particular, the reform introduced major changes through the decision to decouple direct payments from production, mainly aiming at enhancing the competitiveness of Community agriculture.

To summarise, the key points of the 2003 CAP reform, as laid down by Council Regulation (EC) 1782/2003 of 29 September 2003, are:

- *Single Payment Scheme* - EU farmers are provided with a single payment, independent from the quantity of food they produce. However, Member States are allowed to keep a share of farm payments linked to output to avoid farmers abandoning production (partial decoupling)[1]. Detailed rules for the implementation of the single payment scheme have been laid down by the Commission Regulation (EC) No 795/2004 of 21 April 2004;

[1] According to Reg. 1782/2003, Chapter 5, Section 2 (Partial Implementation), in case of arable crops payments Member States wishing to limit the risk of land abandonment may retain up to 25 % of the component of national ceilings corresponding to the arable crops area payments (art. 66). As regards sheep and goat payments, Member

o *Cross-compliance* - The single payment is linked to the respect of environmental and food safety, animal and plant health and animal welfare standards, as well as the requirement to keep all farmland in "Good Agricultural and Environmental Conditions" (see Table 7.2).

Issue	Standards
Soil erosion: Protect soil through appropriate measures	Minimum soil cover Minimum land management reflecting site-specific conditions Retain terraces
Soil organic matter: Maintain soil organic matter levels through appropriate practices	Standards for crop rotations where applicable Arable stubble management
Soil structure: Maintain soil structure through appropriate measures	Appropriate machinery use
Minimum level of maintenance: Ensure a minimum level of maintenance and avoid the deterioration of habitats	Minimum livestock stocking rates or/and appropriate regimes Protection of permanent pasture Retention of landscape features Avoiding the encroachment of unwanted vegetation on agricultural land

Table 7.2 – Good Agricultural and Environmental Conditions (GAEC) as defined by Reg. 1782/2003, Annex IV

o *Modulation* - The reform provides for a progressive reduction in direct payments for bigger farms to finance the new rural development policy. About one fifth of the amounts saved by modulation will be distributed to Member States on the basis of their agricultural area and employment as well as their gross domestic product (GDP) per capita in purchasing power (art. 10). This should theoretically allow some redistribution from intensive cereal and livestock producing countries to poorer and more extensive and/or mountainous countries, bringing positive environmental and cohesion effects (EC, 2002). Detailed rules for the implementation of cross-compliance, modulation and the integrated administration and control system have been laid down by the Commission Regulation (EC) No 796/2004 of 21 April 2004.

States may retain up to 50 % of the component of national ceilings (art. 67). Finally, in case of beef and veal payments, Member States may retain: up to 100 % of the component of national ceilings corresponding to the slaughtering premium; up to 100 % of the component of national ceilings corresponding to the suckler cow premium and up to 40 % of the component of national ceilings correspondent to the slaughter premium for bovine animals other than for calves; up to 100 % of the component of national ceilings correspondent to the slaughter premium for bovine animals other than for calves; up to 75 % of the component of national ceilings corresponding to the special male premium (art. 68).

- *Strengthened second pillar measures* - Unlike the previous reforms, the 2003 reform primarily affected pillar one, while influencing rural development measures only marginally, mainly strengthening rural development by transferring resources from pillar one to pillar two through modulation. However, Reg. 1783/2003 – which is also part of the Fischler reform – amended the Rural Development Regulation, i.e. Reg. 1257/99, by reinforcing support for young farmers, widening the scope of support for forestry, increasing EU co-financing rate for agri-environment and animal welfare as well as maximum level of support for less-favoured areas. It also introduced a number of measures to be added to the list of measures already in place, such as: food quality measures (e.g. participation in quality schemes); meeting EU standards related to the environment, health (public, animal, and plant), animal welfare and occupational safety; animal welfare (beyond good animal husbandry practice); support for the implementation of Natura 2000.

7.3.2 – SWOT analysis of CAP pillar one measures after the 2003 reform as regards land abandonment

Direct payments to farmers under pillar one are potentially important for abandoned land management in at least two ways: they have a significant effect on farm viability and business decisions, and they introduce certain environmental requirements aimed at avoiding land abandonment, i.e. cross-compliance (Keenleyside *et al.*, 2004). According to a OECD analysis of the 2003 CAP reform, among its main expected impacts are a clear movement from crop land to pasture land and a significant extensification, in particular in terms of reduced density of cows per hectare (OECD, 2004). The Fischler reform, which introduced major changes within the CAP first pillar, is characterised by positive as well as negative implications, which can be classified as strengths, weaknesses, opportunities and threats (SWOT) with regard to the phenomenon of land abandonment.

Strengths

The key element of the 2003 CAP reform is the introduction of a Single Farm Payment (SFP) independent from production, allowing farmers greater freedom to produce in accordance with the market needs. By decoupling financial subsidies from production, inputs towards further intensification of farming practices cease, thus limiting the influence provided by the CAP in this sense.

Decoupling should in theory allow farmers to tailor output to demand by reducing incentives for overproduction, and thus minimises the need to dump EU farm surpluses onto the world market. Decoupled farm subsidies are actually deemed non-trade distorting under World Trade Organization (WTO) rules, which means that they are not subject to the cuts widely expected to result from the current Doha Development Agenda (DDA)[1] (Buck and Ortiz de Arri, 2003). Similarly, 2003 CAP changes are also going in the direction indicated by OECD Ministers towards greater market orientation and lower market distortions, mainly by means of a more significant decoupling of payments from production (OECD, 2004). As a positive effect of this reform, distortions to international trade are therefore reduced.

However, the actual strength of the new course of the CAP mainly relies on the vision it is based on, which is summarised by the following statement included into Communication from the European Commission to the Council and the European Parliament on the mid-term review of the CAP of July 2002: "*agricultural policy expenditure must be justified by the products and services which society at large expects farmers and rural areas to provide. A common agricultural policy that encourages surpluses, which then have to be disposed of, is no longer acceptable or sustainable. Public expenditure must yield something in return – whether it is food quality, the preservation of the environment and animal welfare, landscapes, cultural heritage, or enhancing social balance and equity*" (EC, 2002).

Weaknesses

Although significant, modulation, i.e. the transfer of funds from the first to the second pillar, is a rather slow and limited process. At an annual rate of 5% from 2007, receipts from modulation will amount to 1.2 billion Euros, a modest sum in comparison to total expenditures within the CAP (OECD, 2004). Unlike pillar one, there is only partial EU funding for pillar two measures, which however can be combined with state aids. Although increased, funds allocated to pillar two measures are still inadequate to the actual needs.

Moreover, according to Reg. 1782/2003 Single Farm Payments are established on the basis of the so-called "reference amount", which is given by the three-year average of the total amounts of payments which a farmer was granted under the support schemes during the years 2000, 2001 and 2002. Hence, it is obvious that payments remain somehow coupled to the past level of production, at least for the moment. Since Single Farm Payments for each individual

[1] The main purpose of the Doha declaration of November 2001 was to correct and prevent restrictions and distortions in world agricultural markets, thus including removing of domestic support to farm activities.

producer are based on the claims of that producer in the reference period, this means that the more a farmer has produced during that period, the more subsidies he was granted, the bigger is the amount of subsidies he is eligible to be paid. Single Farm Payment, which is based on historical entitlements, remains largely linked to farm size. Hence, most support will continue to benefit larger, and often richer, farmers (OECD, 2004). Once more, CAP system favours major producers using intensive farming practices, while small producers using extensive farming systems – although eligible for other kinds of financial support, such as the rural development measures – are not benefited by market measures.

Finally, since a uniform implementation of the rules setting cross-compliance in the different countries and regions in the EU is not ensured, this may potentially lead to heavy market distortions (Noerring, 2005). Furthermore, cross - compliance is a weak measure where the underlying economic context is weak (Felton, 2005).

Opportunities

As already mentioned, the Fischler reform brought the unquestionable advantage to transfer funds from first to second pillar by reducing price support. Art. 10 states that "*all the amounts of direct payments shall be reduced for each year until 2012*" and that "*the amounts resulting from application of the reductions shall be available as additional Community support for measures under rural development programming financed under the EAGGF Guarantee Section*". Apart from the direct advantage deriving from the increased availability of funds to be allocated to rural development measures, it is important to underline that any reduction in support to intensive agriculture in favourable locations benefits less competitive forms of agriculture such as those in the uplands.

Single governments have a great deal of flexibility in how they may use funds allocated to rural development measures. More particularly, Member States are allowed to retain up to 10 per cent of their total pillar one funding as a "national envelope" and use it to make additional payments to specific types of farming which are "*important for the protection or enhancement of the environment or for improving the quality and marketing of agricultural products*"(art. 69). The so-called "national envelope" could be a valuable policy tool in the longer term, e.g. to support livestock farming on semi-natural grasslands (Keenlyside *et al.*, 2004).

Regulation 1782/2003 itself provides for extensification payments with regard to cattle breeding, also calling for effective policy measures for protection of permanent pastures by Member States, thus encouraging a revival of the traditional transhumance to summer pastures.

The cross-compliance mechanism is supposed to guarantee that the Single Farm Payment is linked to the respect of certain conditions, among those the requirement to keep all farmland, "*especially land which is no longer used for production purposes*", in "*good agricultural and environmental condition*" (art. 5). All farmers who receive pillar one direct payments for their land must meet cross-compliance requirements which apply whether the land is used for production or is left unused. The framework for defining good agricultural and environmental conditions (see Table 7.2) makes specific reference to a "*minimum level of maintenance to avoid the deterioration of habitats and the encroachment of unwanted vegetation on agricultural land*" (Annex IV). In particular, "*Member States shall ensure that land which was under permanent pasture at the date provided for the area aid applications for 2003 is maintained under permanent pasture*" (art. 5), even though meaningful derogations exist.

Finally, the decoupling process has opened agricultural policies to overall rural development and could facilitate turning some of the natural handicaps of mountains into advantages, such as cultural heritage, landscape, high-quality products and diversification of rural economy. Indeed, for an increasing number of countries the maintenance of agricultural land use in mountain areas is nowadays more important than production, also from an economic point of view.

Threats

According to the decoupling scheme, farmers are allotted payment entitlements exclusively based on historical reference amounts received during the period 2000-2002 (OECD, 2004). This means that farmers receive subsidies wholly irrespective of what they produce or even *whether* they produce now (Trarieux, 2004). Theoretically, farmers may even receive subsidies for land, which is no longer cultivated. Therefore, from many parts great concerns raised about the negative effects that such a scheme may have on farming systems in the disadvantaged areas, where there will be no economic interest anymore to produce for farm prices below the production costs (Coordination Paysanne Européenne, 2003*).* Possible consequences are farmland desertion, on the one hand, or even intensification of agricultural practices, on the other hand.

Production in most marginal areas may even stop if appropriate accompanying measures are not introduced, bringing about tremendous impacts on society and the environment (Noerring, 2005). Following the criticisms raised by the Communication from the Commission to the Council and the European Parliament on the mid-term review of the CAP of 7 July 2002, the European Commission itself recognized the threat of abandonment of agricultural activities potentially caused by decoupling (EC, 2002).

In order to avoid the negative consequences, farmland abandonment in particular, the possibility to choose for a partial decoupling has been introduced in the final compromise achieved on the CAP reform in June 2003: nevertheless, the extent to which Member States can maintain a partial link between aid and production is rather limited and concerns about the effectiveness of partial decoupling and the other proposed measures towards prevention of land abandonment are quite widespread (ELO, 2003).

In Italy, for example, decoupling has been fully adopted into the new regime, which entered into force starting from the 1st of January 2005, following the ministerial decree of the 5th of August, 2004, acknowledging the 2003 reform. No partial decoupling has been maintained, apart from a couple of exceptions, such as the dairy sector, to which decoupling will be applied starting from the year 2006.

Theoretically, land abandonment should also be prevented by cross-compliance and the application of the Good Agricultural and Environmental Condition; yet, GAEC may be a useful tool to prevent land abandonment only if it is effectively enforced by means of regular inspections.

Although desirable under several points of view, the further reduction in productive-oriented subsidies by the EU is likely to accentuate extensification (OECD, 2004; Gelan and Schwarz, 2005) and accelerate marginalisation trends in the regions characterised by the least favourable natural, economic and social conditions, which will be even more threatened by uncontrolled land abandonment, unless other kinds of policies will compensate for the reduction of payments coupled to production.

7.4 – Responses influencing pressures: CAP rural development measures (Pillar Two)

Although significant, mountain areas are only marginally interested by direct payments within pillar one, while rural development measures represent by far the most important share of public subsidies for mountain farmers. In particular, rural development measures comprise agri-

environmental measures and compensatory allowances for less-favoured areas, as previously described, and are currently regulated by Reg. 1257/99 "on support for rural development from the European Agricultural Guidance and Guarantee Fund (EAGGF)", recently amended by Reg. 1783/2003.

7.4.1 – Agri-environment and less-favoured areas schemes

Agri-environment scheme as laid down by Reg. 1257/99 is a general framework to be implemented by zonal programmes at Member State level. Member States can actually choose among a wide range of possible measures. For instance, agri-environmental programmes may include granting a premium to farmers who on a voluntary and contractual basis commit themselves:

- to reduce substantially, or maintain a reduction, in the use of fertilisers and/or plant protection products;
- to adopt or continue with organic farming production methods;
- to change to, or maintain, more extensive forms of crop production, or to convert arable land into extensive grassland, or to reduce the stocking rate of sheep and cattle per forage hectare;
- to use farming practices compatible with the protection of the environment and natural resources, as well as the maintenance of the countryside and the landscape;
- to rear animals of local breeds in danger of extinction or plants endangered by genetic erosion;
- to maintain abandoned farmland or woodlands for reasons of environmental protection (e.g. mowing in steep and mountainous areas);
- to set aside farmland for a certain period of time with a view to its use for environmental purposes;
- to manage land for public access and leisure activities.

The support in respect of an agri-environment commitment, which shall involve more than the application of usual good farming practice, is calculated on the basis of three factors (art. 24):

- the income foregone;
- the additional costs resulting from the commitment given
- the need to provide an incentive.

Maximum amounts per year eligible for Community support are calculated on an area basis, namely that area of the holding to which agri-environmental commitments apply.

As previously mentioned, agri-environment support was firstly introduced with two aims:

- to reduce the *negative* environmental impacts caused by intensive agricultural activities, especially in terms of water and soil pollution, on the one hand;
- to compensate farmers for the *positive* externalities provided by extensive farming practices in terms of countryside stewardship and environmental conservation, on the other hand.

As regards mountain farming, the latter goal is by far the most important: in mountain areas, which usually present unfavourable conditions for intensification and mechanisation of agricultural activities, agri-environment support mainly aims at maintaining the *status quo*, rather than bringing about extensification or reduction in the use of chemicals.

Such a maintenance of the present state is obtained by avoiding intensification on the one hand or abandonment on the other hand, thus providing mountain farmers with a sort of compensation for the work they are already doing, whose positive effects are not comprised within the products' market price, i.e. they are *externalities*. Payment rates in these cases can cover the costs of maintaining farming activity where it is not economically viable, in contrast to other situations where payments simply cover the loss of income resulting from reducing the intensity of management (Keenleyside *et al.*, 2004).

Yet, great concerns about the effectiveness of this kind of measures in achieving this double goal raise from many parts. In particular, the policy seems to have failed to adequately address the issue of pesticide and nitrate pollution as regards intensive farming, largely because farmers in the areas affected do not generally participate in this scheme, as this would likely lead to a drop in farm income (Buller, 2000). Indeed, one of the most widely recognized problems of agri-environmental mechanism is that of the so-called "adverse selection", where schemes are found to have most appeal to farmers who have to make the smallest adjustments to their farming practice to qualify for payment, i.e. those farmers who can meet the conditions of a management agreement with the lowest opportunity cost.

As a consequence, this may compromise the environmental value for money of scheme, because the result is few additional environmental benefits and over-compensation of participating farmers (Potter, 2002). In other words, agri-environment support does not provide sufficient incentive for farmers practising intensive agriculture to undertake to improve their farming systems in environmental terms. On the other hand, the dominance by schemes that seek merely to maintain extensive production methods raises a number of questions regarding

both their real objectives (supporting marginal farms, compensating grass-based farming systems for their ineligibility for arable and forage crop payments) and the evaluation of their effectiveness (Buller, 2000).

The definition of the goals is actually essential in order to be able to monitor the effectiveness: in Austria, for instance, although many measures and the largest share of the budget allocated to agri-environment scheme are utilised for grassland maintenance (e.g. keeping of Alpine pastures and meadows), the overall grassland surface has not extended in the last decade, while remaining substantially unchanged. Yet, in order to evaluate the opportunity of investing in these measures, a comparison between the current state and the scenario *without* these measures would be useful. Indeed, although agri-environmental measures do not always bring about an improvement of the situation in terms of reduction in the use of chemicals or enhancement of extensive production methods, they contribute to limit the usage of chemicals as well as to maintain extensive farming practices, thus playing an important role in the conservation of mountain farming and the relative cultural landscapes.

Farmers in mountain areas are also strongly supported by compensatory allowances for less-favoured areas (Reg. 1257/99, art. 14). The LFAs are particularly rich in High Nature Value features (EC, 1997); yet, contrary to agri-environment scheme, the primary goal in this case was initially the compensation of handicaps and the maintenance of farmers in areas considered as being at risk from depopulation and abandonment. Environmental matters were added to the socio-economic concerns, which firstly led to the approval of the Less-Favoured Areas Directive 75/268/EC, in 1999, when farmers receiving compensation payments within the LFAs were obliged to "*apply usual good farming practices compatible with the need to safeguard the environment and maintain the countryside, in particular by sustainable farming*" (art. 14).

As further consequence of the increasing attention towards environmental matters and particularly the concerns about the intensification often caused by LFAs payments, headage payments, i.e. payments based on the number of Livestock Units (LU), were replaced with an area payment scheme, with the objective of encouraging more extensive livestock production.

The overall aims of compensatory allowances as laid down by Reg. 1257/99 are (art. 13):

- to ensure continued agricultural land use and thereby contribute to the maintenance of a viable rural community;
- to maintain the countryside by preserving and promoting sustainable farming systems which in particular take account of environmental protection requirements;
- to safeguard farming in areas with environmental restrictions.

According to the Community Biodiversity Action Plan for Agriculture, the LFAs allowance is "*the Community's preferred instrument for preventing the abandonment of agricultural land, although this objective will be achieved by using a whole set of measures*" (CEC, 2001c). Indeed, despite the various problems, LFAs payments have significantly contributed to the survival of low-intensity systems in several marginal areas, as on many farms such payments constituted more than half of farm's total income and therefore have been crucial to the survival of a big number of holdings (Baldock *et al.*, 1996).

In order to be effectively targeted, compensatory payments need to be duly differentiated, taking into account "*the situation and development objectives peculiar to a region, the severity of any permanent natural handicap affecting farming activities, the particular environmental* problems to be solved and the type of production and the economic structure of the holding" (art. 15). Compensatory allowances shall also be fixed at a level which is sufficient in making an effective contribution to compensation for existing handicaps, but at the same time avoids overcompensation.

Yet, this opportunity has not always been exploited by national or regional governments. To give an example, according to the 2000-2006 Rural Development Plan for the Italian Veneto region, the maximum amount set for compensatory allowances is granted to every farmer, independently from the criteria indicated by art. 15 (Regione del Veneto, 2000).

7.4.2 – The new EU legislation on rural development

Rural development measures have been recently amended through Regulation 1698/2005 "on support for rural development by the European Agricultural Fund for Rural Development (EAFRD)", approved by the Council on the 20th of September, 2005. The Regulation follows a proposal published by the European Commission on the 14th of July, 2004 (Proposal for a Council Regulation on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) (CEC, 2004), aiming at regulating rural development policy for the programming period 2007-2013 by reinforcing CAP pillar two and simplifying its implementation.

Both the proposal and the regulation are based on the awareness that the viability of rural areas cannot be founded on agricultural land use alone, while rural development policy needs to place agriculture in a broader context, that also takes into account the protection of the rural environment, the quality of produced food, the quality of life and the attractiveness of rural areas to young farmers and new residents.

From a technical point of view, the main change is the establishment of a single funding and programming instrument, called European Agricultural Fund for Rural Development (EAFRD).

The reform is axed around three major policy objectives: to increase the competitiveness of agriculture and forestry by means of support for restructuring; to improve the environment and countryside by means of support for land management; to improve the quality of life in rural areas and promote diversification of economic activities through measures targeting the farm sector and other rural actors.

On the basis of these three main aims, the Regulation rearranges most of the existing Rural Development Regulation measures into three priority groups or "axes":

- *Priority axis 1: improving the competitiveness of the agricultural and forestry sector* (articles from 20 to 35). Support targeting the competitiveness of the agricultural and forestry sector shall comprise measures aimed at:
  - improving human potential (e.g. training and information actions, setting up of young farmers and early retirement of farmers);
  - restructuring physical potential and promoting innovation (e.g. farm modernisation, infrastructure development and improvement of the economic value of forests);
  - improving the quality of agricultural production and products (e.g. by helping farmers to adapt to demanding standards and supporting farmers who participate in food quality schemes).

- *Priority axis 2: improving the environment and the countryside* (articles from 36 to 51). Support under this section concerns measures targeting the sustainable use of forestry and agricultural land, such as natural handicap payments to farmers in mountain areas, agri-environment and animal welfare payments, as well as Natura 2000 payments.

- *Priority axis 3: the quality of life in rural areas and diversification of the rural economy* (articles from 52 to 60). Support under this section involves:
  - measures to diversify the rural economy, comprising diversification into non-agricultural work and encouragement of tourism activities;
  - measures to improve the quality of life in rural areas, comprising essential services for the economy and rural population, village renewal and development, protection and upgrading of the rural heritage.

This group of measures could be of benefit in sustaining rural communities in marginal areas where large areas of High Nature Value farmland are at risk of abandonment (Keenleyside *et al.*, 2004).

A fourth implementation axis, called LEADER (articles from 61 to 65), mainstreams the local development strategies developed through a bottom up approach, which were previously financed under the LEADER initiative. LEADER funds can combine funding from the other axes; however, a minimum of 7% of programme funding is to be reserved for the LEADER axis. Member States are given wide freedom on how they wish to implement their programmes, possibly by strengthening this kind of bottom-up approaches. LEADER measures could be useful in funding local schemes to prevent or reverse abandonment, particularly where other rural development measures may not apply (Keenleyside *et al.*, 2004).

Although apparently absent, LFAs compensatory allowances will not disappear from rural development measures: starting from 2007 they will be simply renamed as "natural handicap payments in mountain areas and payments in other areas with handicaps". The criteria for the designation of mountain areas will remain unchanged, while the classification of the intermediate zones – which is currently defined on environmental (low soil productivity and poor climatic conditions) and socio-economic criteria – may change after 2010, as the socio-economic criteria originally used for the delimitation have in many cases become outdated.

Cross compliance, which is currently the baseline for CAP first pillar payments, will apply to the area based measures of axis two as well, including the new LFAs payments and agri-environmental measures.

Finally, Natura 2000 payments, included within the priority axis two, will provide a clear link with EU environmental policy and offer payments per hectare of UAA to compensate for costs incurred and income foregone as a result of restrictions attributable to the Habitats and Birds Directives (Keenleyside *et al.*, 2004).

7.4.3 – SWOT analysis of CAP pillar two measures as regards land abandonment

Although rural development measures are specifically targeted to improve the quality of life of rural communities and maintain the countryside by supporting sustainable land uses, such as extensive farming systems, they have not always achieved their aims in counteracting

depopulation trends and preventing or reversing land abandonment. Similarly to CAP first pillar measures, they present weaknesses and threats, along with strengths and opportunities.

Strengths

Rural development measures represent without any doubt a crucial policy instrument for addressing marginalisation related issues. Their development during the last decades is optimistic, since the role of environmental concerns was strengthened, mostly to the detriment of enhancing agricultural productivity. Also the recent Council Regulation on rural development is aimed at reinforcing even more CAP second pillar. Future trends are likely to move towards the same direction, also because of the World Trade Organization (WTO) indications, pushing national governments into removing of domestic support to farm activities. On the other hand, rural development payments are mostly categorised by WTO as permissible, non-trade distorting measures, as their effects are production-neutral.

Weaknesses

Whether supportive or unsupportive, a subsidies-based policy is often weak in terms of effectiveness and economic sustainability. For instance, subsidies are not always understood nor accepted by people who are not directly involved; they develop passive attitudes, sometimes hindering possible innovative actions; they are not economically sustainable in a long-term perspective; finally, they do not appear to be conclusive, since depopulation trend and land abandonment are still widespread phenomena.

Moreover, subsidies-based policies may indicate an indirect acceptance of mountain marginalisation, by recognising the peripheral role currently played by mountain territories and ignoring the potential function as laboratories of sustainable development that mountains might and should perform, thanks to their rich cultural heritage made of environmentally-friendly farming systems, bio-architectural practices, green energy provision, and so on.

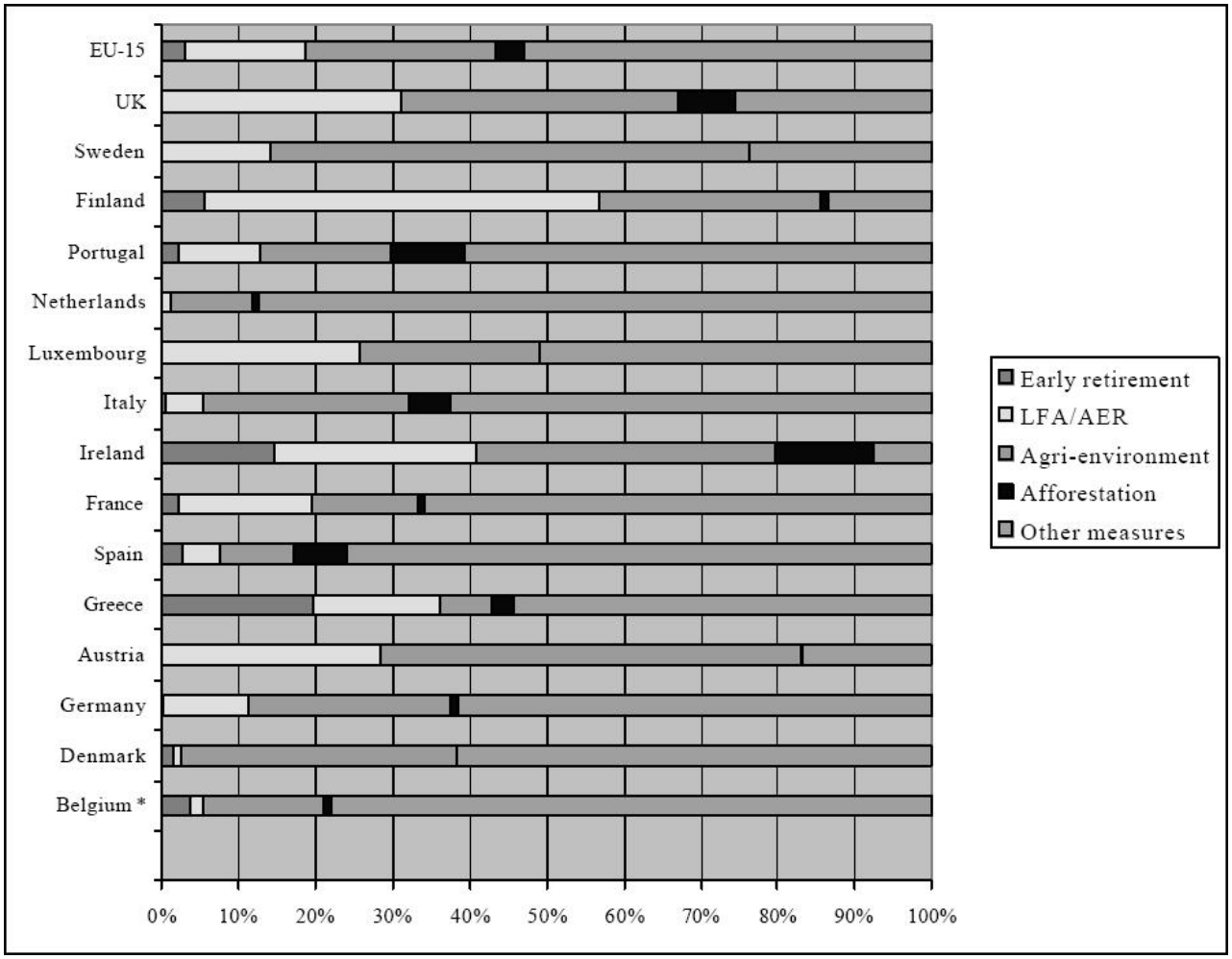
Such an attitude may be overcome by the increasing awareness of the pivotal role of mountain farmers in landscape stewardship, maintenance of environmental resources and defence against natural hazards, with particular regard to geological instability of mountain slopes. When adopting this point of view, the provision of financial support to mountain farming assumes a totally different character, turning from a sort of welfare institution offering simple financial assistance to compensation for the provision of essential services for the whole society.

Similar considerations, for example, led to the establishment of agri-environment payments, which represent the most appropriate way of paying for very specific targeted habitat and

species management on High Nature Value farmland, while acknowledging the value of this management to society (Keenleyside *et al.*, 2004). Yet, although agri-environment scheme is the only compulsory accompanying measure in the current Rural Development Regulation, agri-environment policy remains marginal to the central thrust of the CAP, continuing to represent a very small part of the total budget when compared with price supports, market intervention and compensatory payments to farmers.

On the contrary, although the introduction of cross-compliance refers to LFAs payments as well, a revision aiming at providing even more focused support for less intensive and environmentally valuable farming systems would be appropriate.

More generally, the management of rural development measures is largely up to single Member States, who play a central role in drawing up their rural development programmes and in implementing them (see Graph 7.1).



Graph 7.1 – Planned allocation of Rural Development Plan 2000-2006 expenditure in Member States. LFA/AER refers to less-favoured areas and areas with environmental restrictions *sensu* Reg. 1257/99. Source: Dwyer *et al.*, 2002

Although direct consequence of the subsidiarity principle, such a great freedom given to Member States often damaged the effective implementation of rural development measures, since national governments showing less interest towards this kind of issues did not apply them successfully. However, this is not a weak point distinctive of rural development measures; rather, it affects any EU policy in any field.

Opportunities

Opportunities provided by rural development measures have been largely described throughout this chapter. They represent a potentially powerful tool for counteracting marginalisation as well as for conserving High Nature Value farmed environments currently under threat, by maintaining low-intensity farming activities. In particular, agri-environment schemes are most likely to prevent abandonment where alternative land uses are limited, intensive agriculture is not a particularly attractive option and farmers have the knowledge and skills needed for management of High Nature Value land.

Significant is also the strengthened role of diversification of rural economy as suggested by the EC 2004 proposal. Diversification, which has been an objective of the EU structural policy since the 1992 reform, is now given a strong priority, together with the increased quality of rural life, thus representing one of the main tools for counteracting land abandonment, particularly in those areas affected by geographical marginalisation, where depopulation has been a significant cause of abandonment.

Threats

The adoption of measures aimed at reducing intensive methods in agricultural production has often accentuated abandonment trends in a number of areas. The balance between intensification and abandonment is indeed very fragile and very difficult to manage. This constitutes a major conflict in agricultural policy particularly relating to LFAs and poses a major dilemma to policy makers.

Similarly, the adoption of measures aimed at reducing marginalisation and avoiding abandonment has often created additional conflicts by causing over-exploitation of marginal land (e.g. by over-grazing) and further environmental degradation (Caraveli, 2000). In this sense LFAs support system sometimes has been a counterproductive instrument, by failing to discriminate between farmers who are providing a positive environmental service and those which were damaging the environment (Beaufoy *et al.*, 1994).

However, nowadays this threat has been largely solved thanks to the adoption of environmental parameters within LFAs schemes.

Among the rural development measures, the support for afforestation of marginal land, while being useful for restoring woods in the lowlands, represents a potential threat for mountain marginal areas, since it may accelerate the process of conversion of crops or grassland to forests.

7.5 – Responses influencing state and impacts: nature protection measures

High Nature Value agro-ecosystems are also subject to nature conservation policies directly aimed at preserving them, such as the establishment of protected areas or the adoption of specific environmental measures. While the largest part of environmental law is targeted to prohibit or limit certain behaviours and the usage and/or emission of a number of substances, the most significant environmental measures as regards the conservation of this kind of semi-natural ecosystems are the proactive measures, rather than the restrictive ones.

In particular, the establishment of protected areas might be a useful policy tool as long as protected areas are managed in a proactive way and they take into account the anthropogenic origin of these systems. Significant from this point of view is the Council Directive 92/43/EEC "on the conservation of natural habitats and of wild fauna and flora", the so-called "*Habitats Directive*", which, together with the Council Directive 79/409/EEC of 2 April 1979 "on the conservation of wild birds" (the so-called "Birds" Directive), led to the designation of Natura 2000, an European ecological network of special areas of conservation including various sites of great importance from a nature conservation point of view. The designation of Special Protection Areas (SPAs) for birds under the terms of the EU Birds Directive and the subsequent designation of Special Areas of Conservation (SACs), in accordance with the EU Habitats Directive, represent the most significant policy link between agriculture and nature conservation and are aimed at ensuring that a representative sample of the habitats existing in Europe, and their associated wildlife, are maintained for future generations (Jones *et al.*, 2003).

As mentioned in Paragraph 6.1, several types of species-rich grasslands are listed in Annex 1 of the Habitats Directive (Baldock *et al.*, 1996), so that according to some estimates about half of the designated sites are farmed environments (Bennett, 1997). Indeed, according to the Habitats directive natural habitats are defined as "*terrestrial or aquatic areas distinguished by geographic, abiotic and biotic features, whether entirely natural or semi-natural*". "Natural" habitats thus include "semi-natural" areas as well, created and maintained by human activities,

such as pastures and other types of traditionally farmed lands. In many cases their natural characteristics would disappear if agricultural work or animal rearing were to cease (Delpeuch, 2004). The Habitats Directive contains a crucial premise, recognising that "*the maintenance of the biodiversity may in certain cases require the maintenance, or indeed the encouragement, of human activities*" (CEC, 1992).

On the other hand, the establishment of other kinds of protected areas such as wilderness areas (see Paragraph 8.1) or strict nature reserves aiming at limiting or even avoiding human interventions as much as possible, may not be the proper solution for conserving High Nature Value farmed ecosystems, since these environments do require human intervention in order to be maintained as such, while the lack of any human "disturbance" would cause their evolution towards a completely different state, as described in Chapter 6. In these cases, a strict nature conservation policy aiming at maintaining certain areas "undisturbed" is thus likely to fail in meeting its main purpose, although it might be appropriate in areas remained relatively untouched, where the conservation of such a state requires the safeguard from any external influence.

CHAPTER 8 – THE TWO DIFFERENT VISIONS: "LAISSEZ FAIRE" VERSUS PROACTIVE APPROACH

Spontaneous afforestation of mountain areas is perceived in different ways, depending on the observer's point of view, on where it takes place, on the extent and type of new woodlands and on the time frame considered (Piussi and Pettenella, 2000). Two opposite outlooks gather most of the consensus as regards the phenomenon of farmland abandonment and particularly the consequent forest expansion trend:

- the one which has been referred here as to the "*laissez faire*" approach, characterised by an overall positive view of the phenomena, on the one hand;
- a more critical attitude based on the conviction that the current trends need somehow to be counteracted, on the other hand.

The latter approach has been conquering large consent among researchers studying the impacts caused by such a process, who for the largest part – although not all of them – agree on a critical vision of the phenomenon.

On the other hand, the former approach represents by far the prevailing attitude and it is particularly common in Italy, where it is widespread among the large public opinion, including some environmentalist organisations, the academic environment not specifically dealing with these issues and most of the politicians, even at the highest levels[1].

Despite the extent of the phenomenon, spontaneous afforestation related issues have been initially ignored by the Italian scientific and technical community, while just recently the phenomenon has been analysed through researches which underlined how necessary is to investigate on the ecological and social consequences of the mountain and hilly landscape evolution, aiming at evaluating the impacts caused by forest expansion to the detriment of traditional farmed landscapes (Piussi and Pettenella, 2000). While a considerable amount of literature can be found in several European countries on these topics, such as Switzerland, Austria, Greece, France and Spain, in Italy the research is just at the beginning and still very much sectorial. Yet, according to professor Lanaro, an historian from the University of Padua, in Italy it is not just the southern part of the country to represent a problematic issue (the so-called

[1] An example is given by the research project "Land use as land protection", undertaken by the Italian *Istituto Nazionale della Montagna* (National Institute for the Mountains) (see Paragraph 2.2.5) and expressly aimed at proofing that abandonment of cultivated land does not represent a deteriorating process for hilly and mountain environments, while – on the contrary – it brings benefits both from an hydrological and a geomorphological point of view (Istituto Nazionale della Montagna, 2001).

"*questione meridionale*"), but what might be referred to as the "mountain issue" represents a larger, more serious and widely unknown topic (Pasqualetto, 2005).

Below the two outlooks are described, together with the main arguments supported by their respective advocates.

8.1 – Laissez faire

The "*laissez faire*" approach is based on what are commonly considered to be the positive effects provided by farmland abandonment and forest expansion in particular. It is thus characterised by an optimistic vision of the phenomena. As a consequence, those supporting such an outlook are in favour of forest expansion, which in their opinion should not be stopped or limited significantly, although there might be room for some degree of control over it.

The factors contributing to this kind of vision the most are listed in Table 8.1.

FACTORS CONTRIBUTING TO THE *LAISSEZ FAIRE* APPROACH	**…SOME CONTRASTING OBSERVATIONS**
Compensation of global deforestation trend	*Minor environmental, social and economical value associated with secondary forests in comparison with the primary ones, such as tropical rain forests*
Increased wood supply	*Large extensions of already existing semi-natural forests and plantations are abandoned in the Alps, due to the topographical constraints and the overall stagnation of timber market in Western European countries*
Role played by secondary forests as "sinks" (carbon sequestration)	*Greater efficiency of managed secondary forests with regard to carbon sequestration; spontaneous afforestation not counting as carbon credits within the Kyoto mechanisms*
Increased woodland connectivity, return of large and medium mammals (wolf, wild boar, red deer)	*Damages caused by these species to cultivated land and forests*
Gain of "naturalness" (establishment of wilderness areas)	*Wilderness definitions do not properly fit European cultural landscapes*

Table 8.1 – Main aspects advocated in support of the *laissez faire* approach and relative opposing observations

To start with, small attention is commonly paid to forest expansion, in contrast with the great concern usually arisen by global deforestation trend. Yet, while excessive deforestation undoubtedly originates enormous impacts both at local and global level, uncontrolled spontaneous afforestation might also cause negative effects, namely those described in Chapter 6. While large forest cuttings mainly take place in developing countries, reafforestation and re-

wilding are mostly concentrated in industrialised countries, where marginalisation of mountain farming along with a heavy decline in wood industry have been occurring in the last decades.

As a result, between 1990 and 1995, 56 million hectares of forests were destroyed at global level: yet, while the global community lost an extension of 65 million hectares of mostly biodiversity rich primary forests, an increase of nearly 9 million hectares took place in the industrialised countries, largely due to farmland abandonment (CEC, 2001a). For all the reasons described in Chapter 6 the environmental, social and economic value of these secondary forests deriving from re-wilding processes occurring in abandoned land is not comparable at all with the value held by primary forests. Tropical rain forests, for instance, hold a high commercial value, are of primary importance for local populations depending upon their resources and play a fundamental role in terms of biodiversity conservation and the maintenance of hydrogeological balance, so that their removal causes devastating consequences also downstream especially in terms of floods and landslides.

Therefore, the data referring to the extension of primary forests which are felled every year is even more worrying than the average result, according to which the global community lost "only" 56 million hectares of forests as a whole.

Some commentators suggest that the new forests might potentially benefit the timber industry, by increasing wood supply (Price, personal communication, 2005). It has been even stated that accelerating succession on abandoned farmland would be reasonable, since farmland abandonment provides a suitable opportunity for the creation of new woods, considered as a positive trend given the heavily damaged status characterising European forests (Jochimsen, 1991).

Yet, as explained in Paragraph 6.4, the contribution of new forests to market timber is just marginal, because of the very poor quality of the raw material provided by forests resulting from uncontrolled shrubs and trees encroachment into abandoned grasslands, which are also more fragile, thus prone to pests and windstorms.

Furthermore, similarly to what happens to agricultural land, in all of Europe social and ecological functions of forests are likely to continue to gain importance in comparison to their function of wood supply (Piussi and Pettenella, 2000). Timber market has actually become so critical, that large extensions of already existing forests, including those which had been planted during the decades immediately following World War II, are nowadays abandoned in many Alpine regions, and especially in the Italian Alpine arch, due to the harsh topographic

constraints and the strong competition from other European countries, which make timber felling not sufficiently viable in many marginal areas, where costs are higher due to the transport difficulties and the lack of infrastructures, such as the often poor forest road networks.

In Italy, for instance, the expansion of forest area significantly contrasts an opposite trend, i.e. the reduction in the quantity of actively managed forests; data provided by national agrarian censuses reveal a contraction by 18.3% of cultivated woods in mountain areas, equivalent to more than 585,000 hectares, between 1990 and 2000 (Comitato Tecnico Interministeriale per la Montagna, 2003).

Slightly different is the situation as regards firewood gathering by local population: although this activity had been abandoned almost completely until a few years ago, nowadays an increase in the usage of firewood is registered, mainly due to the rise in oil price, which makes alternative energetic resources more competitive.

For all these reasons, a definition of the strategies that contemporary society may adopt in managing such new forests is needed (Piussi and Pettenella, 2000). This should lead to an improvement of the forests' quality in terms of increased biodiversity, recreational value and to a better protection of existing forests, rather than to a quantitative increase in forest cover (Gold, 2003).

Similarly, the role of secondary forests as "sinks" is usually largely overestimated. Indeed, as described in Paragraph 6.4, the efficiency of the new forests deriving from uncontrolled natural succession is usually scarce with regard to carbon sequestration, since the life stage characterised by the highest degree of carbon sequestration, i.e. the fast growing phase, lasts just for a short time, while plants soon slow down in absorbing and utilising carbon dioxide.

Moreover, it is also useful to remind that, while burning, wood releases all the carbon which had been sequestrated earlier. Since new forests deriving from secondary succession occurring in abandoned grasslands are more prone to fire hazards, this means that their positive contribution in carbon sequestration in the course of several years might be totally vanished in a few hours. On the contrary, primary forests, as well as cultivated secondary forests, are significantly less prone to fire hazards.

Yet, not just fires, but also the natural degradation of organic substances releases great amounts of carbon dioxide. In managed secondary forests, where the successional process is monitored and controlled, trees are felled shortly after completing their growing stage, as soon as they have come to maturity. In this way forest ecosystem is constantly and artificially maintained young, i.e. in a major growing status. This both allows the removal of the sequestrated carbon, which is thus prevented by re-entering the circulation, and lets trees

renovation, by which the growing process is able to continue. For all these reasons new forests resulting from unintentional, spontaneous renovation are not counted as carbon credits, which only comprise plantations or planned afforestations or reforestations (Ciccarese and Pettenella, 2005).

Another positive aspect stressed by the advocates of the *laissez faire* approach is the fact that, in front of a progressive fragmentation of the natural landscape in every developing region of the world, an opposite trend is experienced in many rural mountainous parts of Europe, namely those recently abandoned by agricultural practices (Farina, 1991). As a consequence, woodland connectivity significantly increases, thus allowing forest species to spread over larger territories.

Yet, as explained in Paragraph 6.2.1, the return of some valuable large mammals such as the red and roe deer, the wild boar and even some predators which had become locally extinct several decades ago, such as the lynx and even wolves and bears, has certainly to be considered an encouraging process contributing to safeguard biodiversity in Europe. Nevertheless, it is also important to take into account the damages locally caused by these species when becoming dominant, and especially by wild boars and deer, inhibiting natural renewal of trees within forests.

Finally, according to a broadly accepted opinion, the process of uncontrolled nature development taking place in large European rural areas represents a sort of reconquest of lost territories by "mother Nature", leading to a gain of naturalness. In many cases re-wilded areas even inspire a false perception of wilderness and untouched landscapes, which have saturated people's thoughts in many parts of the world, and especially in industrialised countries (Höchtl *et al*., 2004).

Such a belief originates from a common, though incoherent, ideological framework which considers as anyway valuable concepts such as *naturalness* or *wildness*, while what happens to have artificial origins, although somehow remarkable, cannot be posed at the same level of what is considered to be "purely natural". Yet, such premises are erroneous, in the sense that they do not take into account the historical roots of European rural landscapes and the fundamental role that the anthropogenic component played in their evolution, as largely explained in Paragraph 6.1.

This idea of gaining naturalness thanks to the re-wilding process has been stimulated or even enhanced by the recent but very common practice of designation of long abandoned cultural

landscapes as "*wilderness areas*". Yet, a clearer explanation of what is meant respectively by *wilderness*, *wildness* and *naturalness* is necessary.

According to the IUCN (International Union for Conservation of Nature and Natural Resources), a *wilderness* area is "*a large area of unmodified or slightly modified land, and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition*".

Likewise, according to the US Wilderness Act, "*a wilderness, in contrast with those areas where man and his own works dominate the landscape, is recognized as an area where the earth and its community of life are untrammelled by man; it generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable*" (US Congress, 1964).

Wildness and naturalness may thus be seen as two attributes of wilderness ecosystems, where *wildness* is the relative lack of intentional human manipulation, while *naturalness* is the relative lack of human influence (Cole, 2001). This duality allows a distinction between a "wild" and a "natural" wilderness. While "wild" wilderness is a purely and untrammelled territory free from any intentional human manipulation and control, "natural" wilderness ecosystems have been simply no more influenced by humans since a significantly long time (*ib.*).

According to these definitions, keeping wilderness wild implies keeping wilderness natural as well. Equally, keeping natural wilderness ecosystems implies the maintenance of such a status of no-influence. Therefore, in any case wilderness conservation requires to avoid any anthropogenic disturbances by limiting artificial influence as much as possible. Though, it is important to keep in mind that no influence does not mean no intervention, while on the contrary it is necessary to effectively intervene in order to protect an area from any external interference, although impossible or even undesirable in most of the cases, since ecosystems are open systems usually highly dependent upon external inputs, and human disturbance forces are spread all over the globe.

To get round this problem, Cole proposes two different strategies of managing wilderness. The former is based on the control over wilderness ecosystems aiming at compensating for unnatural effects of human activity. This strategy thus sacrifices some of the wildness of wilderness, while enhancing naturalness. Alternatively, if we refrain from exerting control, then wildness is enhanced at naturalness' costs (*ib.*). Managers making such decisions must thus face the dilemma of choosing between wildness and naturalness. The most common compromise has been to manipulate ecosystems occasionally towards a somewhat more natural state.

Although the ideal state would be both wild and natural, i.e. both unmanipulated and uninfluenced by humans, the result is usually an average level of wilderness that is neither very natural nor very wild. A preferable solution would then be to manage some wilderness areas for a high degree of naturalness, while others could be maintained unmanipulated, thus being managed for wildness and used as a reference to manipulated landscapes (*ib.*).

However, in the case of European mountain landscapes, and especially the Alpine ones, the problem is not as much how to manage and maintain wilderness, as to understand whether there is some wilderness and, if so, how to recognize it. It might actually be objected that there are no landscapes left in the Alps which are either unmanipulated or uninfluenced by humans, or both.

If we try to adapt the definitions of wilderness provided above to Alpine landscapes, then we are somehow forced to admit that there is no wilderness in the Alps, while these landscapes are more properly described by the definition provided by the European Landscape Convention, which – as already mentioned – states that the landscape is "*an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*" (Council of Europe, 2000). In contrast with the definition of wilderness, the concept of landscape does not exclude the human component, which on the contrary is given great relevance for its contribution in shaping the present state of the territory.

A reflection is thus necessary on the purpose of establishing wilderness areas in European mountains, whether these have to respond to nature conservation demands or they are mainly related to precise regional planning choices or even marketing strategies, aimed at strengthening the tourist appeal of these areas. In the former case, a review of nature protection policy would be opportune, while in the latter case a greater transparency would be necessary throughout the decision-making process, so that the reasons leading to the establishment of wilderness areas are clearly stated, together with the meaning attributed to such a concept in the European context. In any case, decision-makers should be more aware of the positive and negative aspects of large scale re-wilding, and all stakeholders, especially the interested local communities, should be included in any decision-making process concerning the establishment of protected areas which are left to develop without human control (Höchtl *et al*., 2004).

Over the past 20 years the establishment of new wilderness areas has been increasingly supported by a growing number of researchers and politicians. Yet, so far only a few studies have documented specific ecological and socio-cultural effects of wilderness development in areas where it is being encouraged as a nature conservation strategy.

One of the few researches focusing on this topic has been undertaken by the Institute for Landscape Management at the University of Freiburg, within the framework of the research project "*Changes in Alpine landscapes resulting from a decline in land use in the Val Grande National Park and Strona Valley – from rural landscape to Wilderness*". The Val Grande was established as National Park in 1992, while being also declared the largest wilderness area of the Alps and Italy. Currently, the Val Grande National Park covers an area of 12,000 ha in the northeast of the Italian Piedmont region, which had been cultivated and strongly affected by human activities since the Middle Ages and until the end of World War II (*ib.*).

The results from this project suggest that, although the increasing demand for freely developing landscapes somehow deserves to be satisfied, nevertheless it is important to bear in mind that, if we are to consider the central meaning of wilderness and value the history of European cultural landscapes, then these areas should not be called and designated as wilderness areas (Höchtl *et al*., 2004; Höchtl, personal communication, 2004; Lehringer, 2001).

On the other hand, the decision of setting aside large areas of land letting them evolving without any human control is not to be rejected at all: however, it should reflect precise land use planning strategies, whose goals need to be defined in order to be able to monitor their convenience and effectiveness. Such an approach would allow to set a range of parameters by which defining spaces where unmanaged spontaneous afforestation is acceptable or even desirable, for some reasons, along with areas where different types of vegetation would be preferable (Piussi and Pettenella, 2000).

In the former case, ecologists should hopefully give advice on the selection of land to be abandoned and the management of such land to policy makers, planners and land managers (Brown, 1991). On the other hand, in the latter case two management alternatives are possible: either to try to counteract secondary succession by inhibiting it and/or by preventing abandonment, or – conversely – to let it evolve under control and active management, in order to acquire secondary forests with a high potential commercial, recreational and ecological value.

8.2 – Proactive approach

In contrast with the *laissez faire* approach, which tends to limit human intervention as much as possible, letting abandoned farmland evolve without any or little restraint, the proactive approach is based on the conviction that as the negative consequences prevail over the positive ones, spontaneous afforestation should be counteracted in several ways, by stemming, inhibiting

or even preventing it. Such an outlook is common in particular among researchers specifically dealing with impacts caused by the decline of agricultural activities and the consequences of farmland abandonment, included the author herself.

Although quite rare among common people, especially those not resident in mountain areas directly affected by such processes, the awareness of the importance of maintaining extensive farming practices is quite well rooted within the European Community institutions, whose many documents and strategic policy tools reflect considerable efforts against the decline of mountain farming and farmland abandonment (see Chapter 7), though the issue of forest expansion seems to be less perceived as a problem.

Overall, most of the negative impacts caused by land abandonment and particularly the consequent re-afforestation trend are not sufficiently taken into account by the large public opinion, nor a broad (i.e. multisectorial and interdisciplinary) vision is always adopted while assessing the positiveness of such a phenomenon.

Contrary to the above described widespread belief, according to which woodland expansion taking place in industrialised countries is a positive process, contributing to counteract deforestation trends in other parts of the globe, the increase in forest extension causes negative effects in economic, social and environmental terms, as largely described in Chapter 6.

Biodiversity, land value, social and cultural heritage seem all to be heavily affected by this process, although the question is still largely debated. In particular, land desertion and spontaneous afforestation pose a serious threat to variety, which typically characterises European mountain landscapes: the mountain regions are actually "*a reservoir of diversity of environments and cultures*", which expresses itself through a "*magnificent*" variety of "*cultural landscapes*" (Euromontana, 2000), endangered by the current homogenisation trend, which tends to level such a unique richness.

Therefore, while according to a common opinion efforts need to be mainly concentrated on contexts characterised by *unsustainable development*, where problems of pollution, congestion, over-exploitation of natural resources and land consumption occur, on the other hand also contexts characterised by *unsustainable "un-development"* need to be considered, since environmental problems do occur even in this case. It is thus important to underline that not just protection from improper use of natural resources is essential, but also defence from "improper non-use" of natural resources, which used to be intensively exploited, has to be addressed.

As regards the Alps in particular, while the main focus is usually on the problems of overdeveloped Alpine regions, the problems of remote, economically weak regions are hardly recognized (see Paragraph 1.1.2). Yet, environmental degradation in the Alps results not only from overuse of natural resources, as is often assumed, but also from under-use, when land which was once cultivated or grazed is not managed any longer (Stone, 1992).

When dealing with natural or semi-natural ecosystems a no-intervention strategy is a strategy by itself, in a sense that the state of the art cannot be maintained as such by simply not acting, while maintenance needs to be proactively planned and managed. In this sense, neglect is the main and most harmful threat to mountain habitats.

On this purpose it is important to remind a concept which has already been mentioned in Paragraph 3.1, i.e. that marginalisation is a *process*, in a sense that it affects areas, which did not use to be marginal in the past. This means that what is abandoned in most of the cases is represented by land which has been being deeply modified and influenced by human activities for a very long time. As a consequence many agro-eco-systems, as well as other semi-natural environments, have become dependent upon the supply of external inputs, artificially provided.

Neglect of previously cultivated or otherwise managed land thus implies, generally speaking, great consequences in terms of loss of stability and ecosystems' resilience, since a system whose equilibrium has been artificially altered needs continuous flows of energetic inputs in order to be maintained as such. Since these inputs are no longer provided in case of abandonment, this might lead to a period characterised by instability and uncertainty of indeterminate length. The duration of such a time frame depends on several factors. However, this transitional period lasts for approximately 200-300 years, depending on the site conditions; in high and arid locations, for instance, it might last for many hundreds of years (Stone, 1992).

Although it might be argued that the adoption of a very long term vision makes such evolution desirable, eventually leading to a more "natural" state, i.e. more similar to the primitive conditions which used to prevail before human beings started to exert their influence, yet it has to be taken into account that – along with the decrease in biodiversity described in Paragraphs 6.1 and 6.2.1 – throughout the intermediate stages of plant succession ecosystems are unstable and there is a greater danger of natural disasters (see Paragraph 6.2.2).

In order to better comprehend such a fundamental concept, a similitude might be useful: a human being, who has been treated by giving him or her a certain medicine, becomes dependent upon that medicine, no matter whether he or she initially needed it or not. Once the therapy is interrupted, the organism starts suffering, since its previous equilibrium was subject to exogenous inputs. Until a new equilibrium has been found, a period characterised by instability

and vulnerability to diseases takes place. Likewise, the same course of action occurs in semi-natural environments when they are abruptly abandoned: ecosystems became so altered by centuries of use, that they experience great difficulty in self-regulation, when abandoned, leading to serious problems such as erosion, pests and fires (Fernandez Ales, 1991).

In other words, semi-natural ecosystems should be treated as "metastable perturbation dependent systems", characterised by a combination of periodic natural and artificial perturbations. These systems cannot be returned to a stationary state of homeostasis, like natural, undisturbed systems, once perturbations have stopped (Naveh, 1994b). The importance of agriculture to the rural environment and to landscape maintenance lies mainly in the fact that, once it has been cultivated for so long, land does not automatically revert to its original state if abandoned. Its continued usage in a well-adjusted way is a pre-requisite for maintaining its environmental worth (EC, 1997).

Hence, simply stopping the perturbations would not result into the restoration of mature ecosystems, at least not in a short or even medium term, while it would be more appropriate to conserve or re-establish all ecological processes to which these systems have been adapted throughout their long history (Naveh, 1994b). Since cultivable land is not inherently ecologically stable, man had to learn how to give it the stability necessary to prevent natural disasters. Keeping a proper mean between overuse and underuse is thus decisive in determining whether cultivated land remains stable or not (Stone, 1992).

It might thus be wise to restore this land and to design effective methods to manage biotic change on abandoned land to desired end points, by manipulating or influencing early succession stages through active management (Brown, 1991). However, at a European scale the landscapes are so diverse and have been so differently utilised by the humans in the past that it becomes difficult to find common strategies of land and biodiversity conservation. Yet, a common philosophy could be to maintain the highest value of the cultural landscape, because in many cases, although not in all, it is synonymous with optimal biodiversity (Farina, 1991).

Of course, if the process of land abandonment advances, despite the loss of cultural landscape and its associated habitats which will occur, new habitats, such as those resulting from natural ecosystem dynamics, would form. Yet, we might reasonably assume that the evolving landscape is not likely to be ecologically and/or economically valuable or even hospitable as a living space for humans, as numerous sociological and ecological studies suggest, at least for quite a long time (Höchtl *et al*., 2004).

To summarise, we might say that advocates of the proactive approach, although aware of some positive effects deriving from farmland abandonment and forest expansion, believe that such positive aspects are somehow overcome by the negative impacts, as described in Chapter 6. Such an opinion is based on the adoption of the definition of landscape provided by the European Landscape Convention, which ascribes a fundamental cultural character to European mountain landscape, and Alpine landscapes in particular. From such an assumption also derives a vision of agriculture, and especially mountain farming, as a multifunctional activity, aimed not only at providing foodstuffs and fibres, but also biodiversity, landscape, recreational spaces, soil protection and various other goods and services. Thus, the positive externalities provided by agricultural practices are primarily cared about, although negative impacts are not left aside.

SECTION III

GOOD PRACTICES, STRATEGIES AND INTERVENTION TOOLS

CHAPTER 9 – POLICY MEASURES AS A RESPONSE TO COUNTERACT FARMLAND ABANDONMENT: THE AUSTRIAN POLICY ON MOUNTAIN FARMING

9.1 – The Austrian context: facts and figures

Austria is the state with the greatest share of the Alps. The Austria's Alpine area, as defined according to the delimitation provided by the Alpine Convention, comprises 54,569 km^2, representing 65% of the entire federal territory (see Figure 9.1). The Alps correspond to about 93% of the total mountain area, which also includes the Bohemian massif and the Waldviertel.

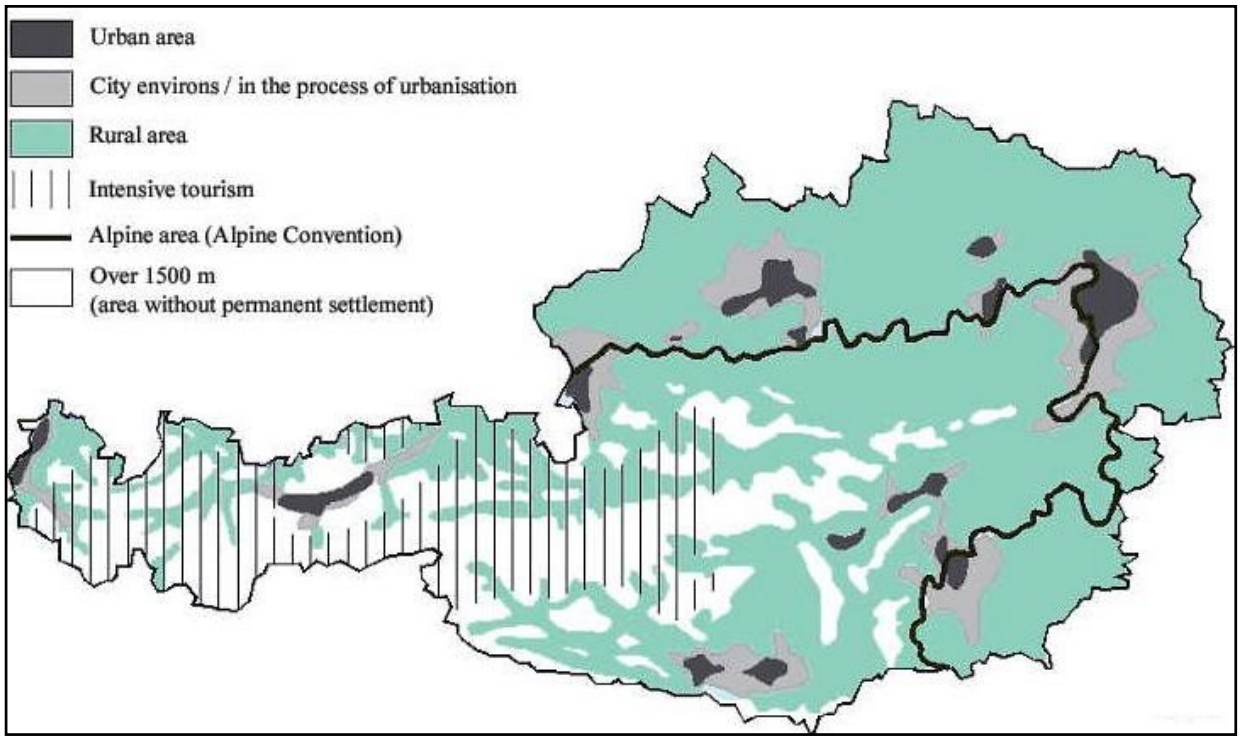


Figure 9.1 – Main land-uses distribution in Austria. Source: Österreichisches Institut für Raumplanung (ÖIR)

Mountain regions are home to about 36% of the Austrian population (Hovorka, 2004), which is one of the highest proportion in Europe of national population living in mountain areas. The overall Alpine population in Austria has been increasing significantly, so that the growing rate is even faster than the rates recorded in the non-alpine regions (Hovorka, 1998), whereas at national scale population increased by 8% from 1981 to 2001 (5% since 1991) (Wiesinger and Dax, 2005).

However, major variations exist at regional and local level in the mountains. In particular, during the last decades the number of inhabitants sharply increased in some of the wealthiest, tourist-based communities in the western regions, namely in the three western inner Alpine provinces of Salzburg, Tyrol and Voralberg (+15% ca. since 1991) (*ib.*), while depopulation affected some old mining and industrial areas in the eastern Alpine provinces, as well as several border regions. Along with such regional differences, local polarisation trends can be observed: population slightly decreased in Alpine highlands, to the point that three fifths of Austria's Alpine population already lives in urban areas (Hovorka, 1998).

Likewise, overageing mainly concerns non-alpine provinces, while affecting mountain regions to a rather limited extent (Wiesinger and Dax, 2005). The share of old people (more than 65) – which is 15.46% at national level – is actually significantly above the average in Burgenland (18.04%), a flat region along the Hungarian border, while it is below the average value in almost all of the Alpine provinces (only 12.41% in Voralberg, the most mountainous among the Austrian provinces) (Statistik Austria, 2005).

Tourism plays a fundamental role in the Austrian economy. The Alpine area accounts for around 85% of overnight tourist stays and the economic activities associated with them (Hovorka, 1998; OECD, 2002). Tourist industry is actually an essential element of national economic development: in 1995 the value added share of tourism in the total Gross Domestic Product (GDP) amounted to approximately 8%, which goes up to 15% if we consider all the economic activities indirectly profiting from tourism (Hovorka, 1998). In the main Alpine tourist resorts tertiary sector may cover 60 to 70% of the gross value added (OECD, 2002). In these areas tourist pressure – expressed in terms of the number of overnight stays per inhabitant – often exceeds the resident population (Wiesinger and Dax, 2005).

Austria has 30% of the visitors, 27% of the overnight stays and 37% of the value added from the tourist industry throughout the Alps, which in turn represents about 17% of the whole tourist industry at European level (*ib.*). In 2003 foreigners accounted for 67.8% of the total number of arrivals (Statistik Austria, 2005).

Tourism is based on the generally high quality of the cultural landscape shaped by traditional agricultural practices, which represents the most important tourist asset in Austria.

On the other hand, the number of employees in agriculture and forestry is dramatically decreasing everywhere, in the mountains as well as in the lowlands. Whereas the proportion of the working population engaged in agriculture was still almost 14% in 1971 (Hovorka, 1998), since then it has fallen sharply. Nowadays the share of people employed in agriculture is only 5.4% in

Austria as a whole. In the Alpine provinces the situation is even worse: in Salzburg, Tyrol and Voralberg the rates are 4.2%, 5% and 2.4% , respectively (Statistik Austria, 2005).

Yet, these percentages refer to the main occupation: on the other hand, a great number of people are only partly employed in agriculture, whereas they rely on other sectors as their main source of income. Indeed, agricultural holdings in the mountains are overwhelmingly family owned and operated by family labour input[1], characterised by a small farming structure[2] (Hovorka, 1998). Only 31% of mountain farms are still operated on a full-time basis, which means that agriculture represents the main economic activity for less than one third of mountain farms (Dax, 1997).

Accordingly, the proportion of females working in agriculture and forestry sector is even bigger than the male proportion (almost 5.7% versus 5.2% as regards Austria as a whole; 4.8% versus 3.7% in the mountainous province of Salzburg; Statistik Austria, 2005), which is quite a remarkable fact, especially when considering that the overwhelming majority of people employed in forestry are usually male. This may be a further indirect confirmation of the fact that farming often is a part-time family activity, carried out either by family members employed in other fields or by housewives or both. In particular, since in part-time farms far more men are employed outside agriculture (and most of them are regular commuters), the share of female farm managers is extraordinarily high (about 30% of all Austrian farms are managed by women, while the EU average is 24%), as at least one member of the family is obliged to act as farm manager, according to Austrian social insurance system (Wiesinger and Dax, 2005).

Therefore, a specific characteristic of Austrian agriculture is the high rate of farmers with a second occupation in non-farming activities, with an average of 60% and peaks up to 85% of part-time farmers in some regions, such as the tourist province of Tyrol (see Table 9.1) (OECD, 2002; Wiesinger and Dax, 2005). Such a high rate of pluriactivity testifies the very intensive relations between the agricultural sector and other economic sectors, such as tourism (Dax, 2002).

Agriculture and forestry contribute just 3% to Austria's GDP, but their share in the total land area amounts to 86% (Hovorka, 1998). Their importance thus relies not as much in their direct economic output, as in their strategic role as land use responsible for shaping the territory and providing environmental and social services, as well as originating important induced activity.

[1] In 2002, 84.8% of people employed in agriculture and forestry were farm family workers, i.e. they were members of the family who owned the farm where they worked (BMLFUW, 2003).
[2] The average size of mountain farms is only 14 ha UAA (of which 11 ha is grassland) and 11 ha woodland (Hovorka, 2004).

Type of farm	Number of farms	UAA	Number of farms (%)	UAA (%)
Full-time	80,215	2,927,921	36.9	38.9
Part-time	129,495	1,757,727	**59.5**	23.4
Legal entity	7,798	2,832,967	3.6	37.7
Total	217,508	7,518,615	100.0	100.0

Table 9.1 – Agricultural management in Austria in 2002. Source: BMLFUW, 2003

Less-Favoured Areas (LFAs) cover 81.1% of the entire federal territory, 69.74% of which is defined as mountain area[1] (BMLFUW, 2004) (see Figure 9.2). As much as 10.3% of the whole territory is covered by mountain bare land (Statistik Austria, 2005).

As regards the land use, 70.85% of agricultural area is included within LFAs, 58.04% of which in the mountains (BMLFUW, 2004).

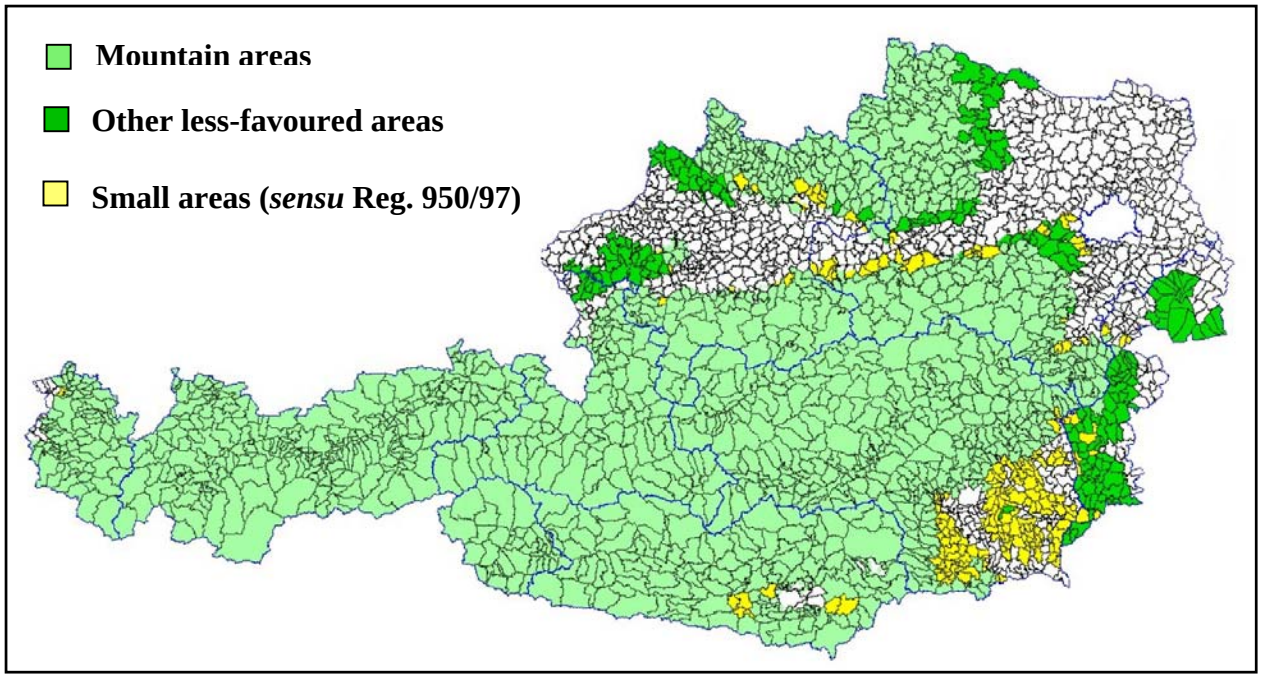


Figure 9. 2 – Mountain and other Less-Favoured Areas in Austria. Source: Bundesanstalt für Bergbauernfragen

As a whole, 43.2% of the total national area is covered by forests (Statistik Austria, 2005). The proportion of woodland in the mountain areas in particular amounts to more than 70%, while grasslands and Alpine pastures account for 50.9% and 18.1% of the total UAA respectively[2] (Groier, 2004b).

[1] According to Reg. 1257/99, mountain areas are defined as areas responding to the following criteria: average altitude of the community at least 700 m above sea level, OR average slope gradient of the community at least 20%, OR average altitude of the community at least 500 m above sea level AND average slope gradient at least 15% (BMLFUW, 2004).

[2] In Voralberg, which is the most mountainous Austrian province, the share of grassland rises up to 96.9% of total UAA, of which 56.2% is covered by Alpine pastures (Groier, 2004b).

Mountain farming is now characterised almost exclusively by grassland production, within which beef farming is most important (Hovorka, 2004). As already mentioned, 11 out of the 14 ha UAA representing the average farm size in the mountains are utilised as grassland. The major significance of animal husbandry is expressed by the high proportion of managed grassland (area ratio 78%) (Dax, 2001). According to some estimates, there are about 12,000 Alpine pastures in Austria (Hovorka, 1998).

On the other hand, arable farming is of only secondary importance and it is decreasing throughout the country. As a whole, the UAA in the mountains fell by 17% in the period from 1960 to 1995 (but only by 6.7 per cent from 1980 to 1990; Hovorka, 1998). Yet, this is primarily attributable to the decline in arable land, which mainly affected mountain areas (-48% in the Alpine provinces, -15% in the whole country) (OECD, 2002). Indeed, in the same time period mountain farmers were even able to extend their grassland area to some extent (Hovorka, 1998). Although grassland extension (meadows and pastures) started to decrease since 1960 at national level (-21%; OECD, 2002), above average proportions of grassland have concentrated in mountain areas (*ib.*), where the extension of Alpine pastures remained substantially unchanged (Groier, personal communication, 2005) and 82.5% of grassland is now located (OECD, 2002; Wiesinger and Dax, 2005). Furthermore, grassland extension decreased by only 3% from 1995 to 1999 as a whole (OECD, 2002) and UAA in LFAs has not declined since 2000 (Hovorka, 2004).

The overall decrease in UAA mainly reflects the huge demand for land uses other than agriculture, such as residential and commercial activities that have developed over the past decades (OECD, 2002; Hoppichler, personal communication, 2005). Yet, part of the area which has no longer been utilised for agricultural purposes (5,000 ha from 1995 to 1999 at national level; Statistik Austria, 2005) has been turned into forests and woodland, mainly intentionally, i.e. through afforestation or reforestation plans, while natural succession is a less frequent phenomenon.

Spontaneous afforestation processes usually affect just marginal agricultural areas such as steep slopes or not easily accessible pastures, while changes in agricultural production systems such as the conversions from arable land to grassland, from high mountain meadows to pastures or from mown meadows to managed woods are more frequent. Therefore, farmland is hardly ever completely abandoned and spontaneous afforestation is a rare phenomenon affecting only limited plots of land.

As a consequence, within the last decades a slight increase in forest areas has been observed (almost 40,000 ha from 1983 to 1999, with a total increment of 1.2%; Wiesinger and Dax, 2005). Such new forests deriving from afforestation processes are more often cultivated than abandoned: the total utilised forest area actually increased by 5% from 1960 to 1995 (OECD, 2002).

Nowadays 51.5% of all agricultural and forestry holdings are situated in the mountains (BMLFUW, 2003). As already mentioned, farming activities primarily focus on grassland utilisation and cattle husbandry: 64% of the dairy cows, 64% of the cattle and 79% of the sheep are reared on mountain farms (Statistik Austria, 2001).

As regards the number of cattle units, this increased by 13.3% from 1950 to 1990, but since then the trend changed and it decreased by 20.6% from 1990 to 2003 (Statistik Austria, 2005). Yet, while overall cattle husbandry is declining in Austria as a whole, it is relatively stable in Alpine areas, mainly because of the lack of alternative possibilities for agricultural utilisation (OECD, 2002).

The overall number of agricultural and forestry holdings decreased by 30% from 1980 to 1999. Both full-time and part-time farms decreased, although part-time decreased less than full-time farms (-22% versus -40%); accordingly, the relative share of part-time farms increased from 53 to 60%, while the proportion of full-time farms significantly decreased from 43 to 37% during the same period (Statistik Austria, 2005).

In particular, the number of farms decreased by 13.4% in mountain regions from 1980 to 1990, while it decreased by only 7.7% in non-mountain regions during the same period (Hovorka, 1998). Yet, as explained in Paragraph 5.2, the number of farms is not a significant farmland abandonment indicator[1]. Moreover, if we disentangle the datum specifically referring to mountain areas, we might notice that the number of farms decreased by 20% in the areas characterised by minor difficulties, while it decreased by only 8% in zones affected by major or extreme difficulties, in terms of internal and external transportations, soil, climate, steepness of the slopes and so on[2] (*ib.*). Such a different outcome largely depends on the subsidies system in force (see Paragraph 9.2.1).

[1] According to the data referring to the number of farms and the UAA participating in the agri-environmental programme, for instance, while in Austria as a whole the number of farms decreased by 16.5% from 1998 to 2002, the UAA increased by 4.1% during the same period (Groier, 2004b).

[2] For instance, while the number of farms participating in the agri-environmental programme decreased by 16.5% from 1998 to 2002 in Austria as a whole, it decreased by only 3.4% during the same period in Voralberg, thus meaning a relatively steady agrarian structure in the most mountainous areas (Groier, 2004b).

To summarise, on these bases we may state that Austrian mountain regions are mainly characterised by demographic increase, relatively steady situation as regards mountain farming, limited marginalisation trends and very little land abandonment and forest expansion. Land use change is actually far more common than abandonment: the most frequent land use changes are from arable lands to grasslands, from meadows to pastures and from mown meadows to managed woods. As a consequence, forest expansion is mainly due to intentional afforestation or reforestation plans, rather than natural colonisation on abandoned farmland, which takes place only in marginal sites such as steep slopes or extremely remote areas.

As we will see in Paragraph 9.3, several factors contribute to this. Yet, it is unquestionable that one of the main ingredients of such a successful situation has been the implementation of a proactive policy towards mountain farming, which started already a few decades ago and it is still going on, although by means of different measures.

To give an example, nowadays Austria has its main budgetary line of agrarian policy under the CAP second pillar: currently 65% of the CAP budget is allocated to rural development measures, while only 35% is utilised for market measures. This is an extraordinarily high proportion compared with any other EU country. The agri-environmental programme (ÖPUL in Austria) and the measures for Less-Favoured Areas cover together 86% of the budget for the 2000-2006 Rural Development Plan, namely 60% for agri-environmental measures and 26% for LFAs compensatory payments (Wiesinger and Dax, 2005). The remaining funds are used for investments, infrastructure development, education, processing and marketing and forest measures, leaving a small share of about 4% for potentially innovative measures of rural development (Dax, 2002).

Despite its strong economic integration within Western Europe, Austria has always been characterised by rather self-sufficient policy and development models. Above all, the agrarian sector has been shaped to a great extent by specific national schemes aimed at preserving rural areas, and in particular remote mountain areas, from the threats potentially posed by international and global developments (*ib.*).

9.2 – The Austrian policy on mountain farming

Subsidy-based support systems and regional planning programmes specifically targeting mountain farming already have a long tradition in Austria. The measures for the support of Alpine pasturing and grazing management in particular made an important contribution to the keeping of farms in the mountains (Hovorka, 1998).

At the core of Austrian mountain policy is the valuation of non-marketable goods (Dax, 2001): support to mountain farming is thus based on the awareness that this plays a key role in providing a defence against natural hazards in terms of avalanches, mud slides, rock slides, floods and erosion, as well as in shaping and safeguarding a fragile and important ecosystem, the visible manifestation of which is the cultural landscape. This in turn represents the living and working space for mountain communities first of all, but also a fundamental economic resource, since according to several surveys cultural landscape amenities are the main reason for tourists spending a vacation in Austria.

Beyond these two fundamental aspects, several other functions traditionally fulfilled by mountain farming have been listed by Austrian observers (Hovorka, 1998; Dax, 2001; OECD, 2002; Dax, 2004):

- providing high-quality fresh foodstuff;
- providing raw materials and energy;
- ensuring the natural fundamentals of life for the whole community, such as soil, water, air and biodiversity;
- implementing ecologically appropriate forms of agricultural management;
- preventing out-migration from peripheral areas and maintaining a basis for socio-economic activities as well as employment opportunities;
- providing an impetus for and renewal of the regional economy.

Since most of those mentioned above are non-marketable goods or services, state aid is believed to be necessary for the maintenance of viable communities in the mountains and the long-term provision of public environmental amenities and services, which are somehow thought to be inconceivable without farming (Dax, 2001; Hovorka, 2002). Accordingly, a sufficiently high number of mountain farms occupied and cultivated on an all-year round basis is considered a precondition for the viability and sustainability of mountain environments. On this purpose, since full- and part-time farmers make an equal contribution to the public interest, they are believed to deserve equal treatment (Hovorka, 1998).

In other words, the overall objective of mountain farming policy may be synthesised as follows: “to guarantee the sustainable existence of the mountain farms, which is necessary to the maintenance of the population and farming suited to regional requirements, as well as the maintenance of the cultural and recreational landscape taking into account the widespread amenities of cultural landscapes in mountain areas” (*ib.*).

The implementation of an integrated and effective policy for mountain areas has always been a crucial political and popular issue in Austria. Accordingly, two complementary lines of intervention can be distinguished (*ib.*):

- *subsidy-based policy*, i.e. a support system based on mountain farms financial aid, within which the "Mountain Farmers Special Programme" (see Paragraph 9.2.1) has been one of the most important means of support;
- *regional planning*, i.e. an integrated regional policy approach aimed at strengthening endogenous regional development (see Paragraph 9.2.2).

9.2.1 – Subsidy-based policy[1]

A property consolidation initiative for the support of those agricultural holdings whose survival was under threat in the mountain farm regions was introduced as early as 1929.

In recent times, a "Working Group for Mountain Farmers" was established within the framework of the Presidential Conference of Austrian Chambers of Agriculture in 1952, with the main purpose of advising on the measures to be implemented for the improvement of the living and working conditions of mountain farmers. Enhancing productivity and raising socio-economic standards for mountain farmers were the main priorities at that time.

The first financial support measures started already at the beginning of the sixties, when mountain farm holdings were given particular consideration by the Austrian Agriculture Act.

The social and ecological services fulfilled by mountain farming were firstly formally recognized in 1969 by the Working Group for Mountain Farmers, with particular regard to its role in conserving the traditional landscape and its connection with tourism.

The raising awareness of the positive externalities provided by mountain farming, together with the need for an integrated, powerful tool for its support finally led to the introduction of the first "Mountain Farmers Special Programme" (*Bergbauernsonderprogramm)* in 1972, aimed at ensuring an economically healthy, socially, culturally and environmentally lively Alpine area, in the interests of the whole Austrian population. This scheme represents the central element of

[1] This paragraph is substantially based on a number of interviews with researchers and politicians from the Lebensministerium, as well as on the following documents: Hovorka, 1998; Dax and Wiesinger, 1998; OECD, 2002; Hovorka, 2002; Hovorka, 2004; CJC Consulting, 2003; Dax and Hovorka, 2003; BMLFUW, 2004; Groier, 2004b; Austrian Agri-environmental Programme (ÖPUL).

Austrian mountain area aid policy, due to the great amount of subsidies which were granted through it as well as its long story, which lasted until 1990, although its basic principles and overall framework are still to be found in the current policy on mountain farming.

The Mountain Farmers Special Programme might substantially be defined as a set of measures, namely:

- **direct income supplements** (group measure A), aimed at improving the income of mountain farmers;
- **infrastructure improvement** (group measure B), with particular regard to road, telephone and electricity networks;
- **regional agricultural aid** (group measure C), aimed at restoring and modernising both residential and farm buildings;
- **improvement of the forest structure and the protective forests** (group measure D), including afforestation and reforestation plans on marginal agricultural land no longer utilised;
- **miscellaneous measures** (group measure E), such as agricultural terrain improvement.

All these initiatives were implemented by means of non-recoverable subsidies. Although all of them were applied throughout the duration of the programme, the funds were not equally allocated; indeed, 76% of the total budget was utilised for direct income supplements (46%) and infrastructure improvement (30%), which were given the highest priority. Moreover, it is interesting to note how priority shifted between these two groups of measures: while at the beginning only 20% of the overall budget was allocated to direct income supplements, in the third programme, i.e. from 1984 to 1990, this measures deserved as much as 56% of the budget. In the meantime, the share of the budget allocated to infrastructure improvement decreased from 40% to just 25%. It is worth noting that the total budget increased by almost 300% during the whole duration of the programmes, to testify the strategic relevance assigned to such an initiative. As a whole, 1.14 billion Euros were spent within the framework of the three Mountain Farmers Special Programmes from 1972 to 1990.

Group Measure B improved living conditions in terms of human health and welfare needs fulfilment and helped the development of part-time farming through the expansion of better transport routes, which gave many people the possibility to undertake off-farm part-time jobs within daily commuting distance. Yet, we may state that direct income supplements represented by far the most important group of measures within the Mountain Farmers Special Programme, which in turn was the main tool of Austrian mountain policy.

In particular, the core measure within the framework of direct income supplements was the federal mountain farmers' allowance (*Bergbauernzuschuß des Bundes*), a basic premium dependent on the level of difficulty and the income situation of the farm, including both agricultural and non-agricultural sources of income. The subsidy amount was therefore proportional to the income of the family managing the farm (the lower the income, the higher the subsidy) and the difficulties of farming (the greater the difficulties, the higher the subsidy). In particular, by taking the overall farm income into account, the allowance incorporated a strong social component[1].

The final goal was to reduce the risks of out-migration and large scale land abandonment in the uplands. These aims were to be achieved by "preserving the viability of these areas", as stated by the governmental act establishing the first Mountain Farmers Special Programme. It was also affirmed that the maintenance of settlement density and the conservation of cultural landscapes had to be a matter of concern for the whole society, not just for mountain communities. In particular, the 1974 Agriculture Act states that agriculture is to be promoted in such a way that it is able to contribute to the maintenance of cultural landscape (Federal Law Gazette No. 809/1974).

In order to improve the efficiency of the measure, mountain farm holdings were classified into four zones, or categories, of difficulty[2]. Categories ranged from 1 (minor difficulty) to 4 (extreme difficulty). The parameters considered included first and foremost the slope gradient of the cultivated area (5 gradient levels) and the climate. Further minor criteria were the accessibility of the farm, the soil productivity and the farm size. The direct payments to mountain farmers were determined to a considerable extent by the handicap category.

This subdivision remained in place until the accession to the European Union in 1995. After that, mountain areas had to be redefined in accordance with EU criteria, i.e. by area demarcation, rather that on a site-specific, individual farm classification, at it used to be.

The last Mountain Farmers Special Programme formally came to an end in 1990. Nevertheless, mountain farmers' allowance was maintained, although a novelty was introduced: in addition to the basic premium (*Grundbetrag*), dependent on the combination of two factors (level of difficulty and income situation of the farm), also an acreage allowance (*Flächenbeitrag*) was

[1] Farm income is a key policy variable. In particular, the fact that any other non-farm component of agricultural household incomes are taken into account avoids underestimation of the real level of welfare and well-being of a certain agricultural community (Phimister *et al.*, 2004).

[2] More precisely, only three zones of difficulty were initially established, while a fourth zone, corresponding to extremely difficult farming conditions, was added in 1985, in order to supply an extra support to farmers facing the highest costs and working constraints.

paid per hectare of UAA, independently of income but graduated depending on the difficulty of farming conditions. Both the basic premium and the acreage allowance differed significantly according to the zones of difficulty: to give an example, in 1993 the basic premium for the lowest level income amounted to 8,000 Austrian schillings for zone of difficulty 1 (i.e. minor difficulty), while it amounted to 27,100 Austrian schillings for zone 4 (i.e. extreme difficulty). Similarly, the acreage allowance amounted to 400 schillings per hectare for zone 1 and 1,800 schillings per hectare for zone 4.

Mountain farmers' allowance was therefore highly differentiated according to a range of conditions, namely the difficulty of farming, the income level and the UAA extension.

Since the beginning of the nineties efforts were made in order to adapt Austrian legislation to EU standards, in view of the EU accession scheduled for 1995. The environmental component prevailed on the social issues, which had become less crucial at that time. The system of direct payments was thus further developed in the direction of compensation for ecological services and the maintenance of cultural landscape. Particular attention was paid to the promotion of organic farming.

However, given the major differences between Austrian and EU agrarian policies, simply adopting EU agrarian structure policy without any modification would have meant a sort of upheaval in Austrian policy for mountain areas. Although the EU did not understandably accept to adjust its system to Austrian criteria, it agreed on a "national grant" for a transitional period of ten years – the so called *maintenance regulation* – to be implemented along with the standard EU direct payment system, based on the number of Livestock Units or hectares. The national grant targeted precisely those farms that would receive reduced compensatory allowances or none at all after the adoption of EU criteria, i.e. the small farms facing a high degree of difficulty which had been preserved until that time by receiving the highest subsidies, equivalent to about 80% of mountain farms in zone of difficulty 4.

Yet, even before the end of the transitional period, namely in 2001, the Austrian agrarian support system radically changed, mainly thanks to the amendments introduced by Agenda 2000 reform (see Paragraph 7.2), which replaced headage payments with area-based payments and gave more autonomy to the single Member States in implementing their Rural Development schemes[1].

[1] Even before Agenda 2000 reform made possible a substantial increase in support for mountain farms with the most severe handicaps, the Austrian government had requested the Commission to allow changes in the EU regulation in

Although the national grant system remained formally in force until 2004, it lost much of its significance since 2001, due to the major alterations to the support scheme undertaken under the 2000-2006 Austrian Rural Development Plan[1] and the overall considerable improvement of support level for farmers in Less-Favoured Areas, with particular regard to mountain farmers.

First of all, thanks to the new framework it was possible to significantly increase the total budget for LFAs payments[2]. Secondly, it was decided to give preferential assistance to farms affected by persistent natural handicaps (e.g. mountain farms), small farms and those with livestock, by means of a highly differentiated support system.

To this end, since 2001 the amount of compensatory allowance for LFAs has been calculated on the basis of the following criteria:

- land area (up to 100 ha)[3];
- land type (e.g. fodder areas receive more support);
- type of holdings (e.g. farms without livestock receive less support);
- the extent of the handicaps that the farm has to face, expressed in terms of the number of mountain farm registry points.

The last factor has a decisive influence on the amount of subsidies to be granted per unit area. In 2001 a complex scoring system called "mountain farmer registry point system" was established.

The elements used in the calculation of the number of points are grouped into three categories: "internal transport situation" (referring to the steepness of the slopes and their distribution within the cultivated area)[4], "external transport situation" (taking into account the accessibility of the farm and its distance from public transport network) and the "climate-soil" conditions (indicating the climate category, altitude and soil productivity).

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this sense by means of the Austrian Memorandum on Mountain Agriculture and Forestry in 1996 (Austrian Federal Ministry of Agriculture and Forestry, 1996).

[1] Austria has actually a single Rural Development Plan covering the entire federal territory.

[2] EU co-financed compensatory allowances increased by 93.4 million Euros from 2000 to 2002.

[3] More precisely, the EU compensatory allowance consists of two components, namely "Area Aid 1" and "Area Aid 2"; although both are calculated on a hectare basis, while Area Aid 1 is granted only for the first 6 ha UAA of the eligible farm holding (e.g. holdings with at least 2 ha UAA, according to EU indications), Area Aid 2 is granted for all the hectares of the farm up to a maximum of 100 ha. Moreover, Area Aid 2 provides a progressive reduction from 60 ha onwards. In addition to that, the Provinces are allowed to grant financial aid for marginal dairy farms in the mountains (so-called "Area Aid 3").

[4] Slope gradient accounts for 87.5% of the internal transport situation. Although of minor importance, another significant aspect is given by the presence of "traditional nomadic pastoralism", accounting for 10 points (out of 320) at most. This refers in particular to the maintenance of a traditional form of animal husbandry, which includes three steps of management corresponding to different altitudes.

The former factor is by far the most important in determining the number of points and consequently the support gap among the different levels of difficulty, which is actually quite well marked[1]. For this reason in 2003 88.5% of the total budget for compensatory allowances was granted to mountain farms, which represented 73% of all the supported farms in LFAs. Average payment was 3,139 Euros per mountain farm holding, while the total amount was 242.9 million Euros. The share of EU in financing compensatory allowances makes up 25 to 50%, while the remaining funds are made available together by the Federal Government (60%) and the Provinces (40%).

The New Mountain Farm Cadastre is GIS-based and it represents a massive database covering the entire national territory with an impressive resolution (every single hectare is actually monitored) by using aerial photogrammetric techniques.

The new compensatory allowance system represents a fundamental tool in achieving some of the primary goals of Austrian mountain policy, such as the maintenance of agriculture and population density in the uplands, the protection of cultural landscapes and the provision of environmental and social services. One of the main strengths of such a system is its high differentiation, primarily achieved by means of the mountain farm registry point system and the criteria on which this is based.

However, the scoring system is not the basis for the differentiation of compensatory allowances only, but it is also used for some elements of the agri-environment scheme, which contributes to further enhance the preservation of traditionally farmed landscapes in mountain areas. There is actually high complementarity between LFAs payments and the other rural development support measures, in particular agri-environmental scheme, whose field of application largely overlaps LFAs.

Along with LFAs compensatory payments, agri-environmental support is the most important form of direct payment for mountain farmers. In 2002 LFAs payments accounted for about 20% of agricultural income for mountain farms on average, although for those farms facing the most severe constraints it went up to 40% of agricultural income. On the other hand, agri-environmental compensations accounted for 24% of the agricultural income of mountain farms on average.

[1] To give an idea, Area Aid 1 amounts to 30.28 Euros/ha for farms belonging to the basic category (i.e. farms with no points), while it amounts to 466.28 Euros/ha (i.e. more than 15 times more) for farms with 300 points, i.e. a farm with very high disadvantages. The maximum number of points is 570, of which 320 (equivalent to 56.2%) may result from internal transport situation. External transport situation accounts for 100 points at most (equivalent to 17.5%), while climate and soil conditions may account for the remaining 150 points (equivalent to 26.3%).

Together, the two schemes provide 63% of public support for mountain farms[1] (as compared with 42% for non-mountain farms) as well as 86% of the total funds made available within the 2000-2006 Rural Development Plan, which represents one of the highest shares among EU Member Countries (see Graph 7.1). Yet, the overall budget allocated to agri-environmental measures is three times as much as the budget allocated to compensatory allowances[2]: in 2003, for instance, while the former amounted to 628 million Euros, the latter amounted to 274 million Euros. As a whole, 4,077 million Euros were allocated to agri-environmental measures within the 2000-2006 Rural Development Plan[3].

The agri-environmental programme has thus the greatest implications for mountain farms. One of the main reasons for that is that their management systems correspond most closely to environmentally sound farming. Accordingly, mountain farmers receive 45% of all the funds allocated to agri-environmental measures. Organic farming in particular is very popular among mountain farms. To give an example, in 2002 81% of organic farms supported were mountain farms and the share of organic farming is higher among those holdings facing a higher level of farming handicaps.

Under the current programme more than 136,000 holdings, corresponding to about 88% of total subsidised farms, with an area of about 2.75 million ha, i.e. 94% of subsidised UAA, participate in the agri-environment scheme. The participation rate of Austrian farmers in the EU agri-environmental programme is thus one of the highest.

The agri-environmental measures are organised in 5 groups:

- **basic measures**;
- **extensification measures** (e.g. renunciation or reduction of means of production);
- **landscape measures**, aimed at preserving the cultivated landscape by maintaining traditional forms of agricultural production (namely measures 17, 18 and 16 to some extent);
- **biodiversity measures**, aimed at preserving the diversity of varieties and breeds;
- **project-related measures** on nature conservation, e.g. erosion protection.

[1] In 2001 agri-environmental payments accounted for 37% of public support per farm unit in mountain areas, compensatory allowances accounted for 26%. On the other hand, market measures contributed barely 24% (35% at national level).

[2] The Austrian government allocated 26% of the total budget to compensatory allowances for LFAs and 60% to agri-environmental measures within the 2000-2006 Rural Development Plan. Only 0.2% was allocated to afforestation measures, while no funds were allocated to early retirement scheme: the overall objective of this scheme is actually to provide an income for older farmers who decide to stop farming and replace them with others who are able to improve the economic viability of the holding, e.g. by modernising it; yet, this scheme may even encourage farm abandonment if adopted by mountain farmers, since in this case modernisation is not a critical issue, while the lack of successors is by far more important in determining the continuity of farming.

[3] As regards the absolute amount of funds allocated to agri-environmental measures, Austria is second only to Germany among the EU Member Countries.

The most important as regards farmland abandonment and maintenance of mountain farming activities are the landscape measures, such as the renunciation of the use of silage fodder in certain regions, the keeping up of cultural landscape and the Alpine pasturage and herding premium (measures from 16 to 18). The preservation of grassland from reforestation or abandonment actually represents an important objective of the agri-environmental programme.

The production of silage-free milk (measure 16) constitutes in many grassland areas a traditional form of agricultural production. Since the renunciation of processing and feeding of silage means higher production costs as well as higher risks and uncertainties mainly due to the weather conditions, a compensation amounting to 185.3 €/ha is provided to those farm holdings committing themselves not to make usage of silage, defined as "feed-stuff made non-perishable by natural fermentation". Such a measure provides indirect benefits to the maintenance of mown meadows and Alpine pastures.

Similar effects are achieved by the measure named "keeping up of cultural landscape" (measure 17), which basically consists in mowing hay meadows in mountain areas. The premium ranges from 145.3 €/ha to 363.4 €/ha, according to the gradient slope (the steeper is the slope, the higher is the premium). Farmers agreeing on this measure are obliged to mow steep meadows at least once per year (once every second year for mountain meadows).

Specifically targeting pastures maintenance is also the measure named "Alpine pasturage and herding" (measure 18). Given the equivalence 1 hectare = 1 Livestock Unit on Alpine pasture, the premium is calculated as follows[1]:

- dairy cows (herding included): 159.9 €/ha;
- horses: 72.7 €/ha;
- cattle, sheep and goats: 50.9 €/ha.

Moreover, an additional premium of 21.8 €/ha is granted when cattle, horses, sheep or goats are herded. A further supplement equivalent to 30% of the granted premium is provided in case the summer shed can only be reached on foot (20% if it is accessible only by special vehicles). In any case, according to the eligibility criteria animals must spend a continuative period of at least 60 days on Alpine pastures. The grazing of cattle, sheep, goats and horses is subsidised in order to protect Alpine pastures from weed infestation and overgrown with bushes.

Measure 27, named "care of ecological valuable areas", seeks to preserve those semi-natural habitats (e.g. wet meadows) whose existence is totally dependent on ongoing agricultural activity,

[1] Although agri-environmental payments must be area-based according to the Rural Development Regulation, such an equivalence has been hypothesized in order to better implement these measures. Nevertheless, a maximum value of 0.6 LU/ha and a minimum of 3 LUs have been fixed as eligibility criteria (i.e. eligible farm holdings must have a certain extent and follow extensive farming practices).

thus being threatened by farmers taking land out of production. However, the empirical results reveal that the current subsidies can at best contribute to the broad preservation of these important landscape elements, but rarely lead to the establishment of new areas (e.g. reflooding of former wet habitats). However, 20.54 million Euros have been spent within this measure, which has been subscribed by 18,318 farmers.

Mountain farmers typically commit themselves to undertake the following measures: 1 (i.e. the basic measure, nowadays roughly corresponding to the Good Agricultural and Environmental Conditions, which will become a compulsory eligibility criterion starting from the next Rural Development Programme), 2 (i.e. organic farming), 3 (i.e. renunciation of means of production on grassland), 16, 17 and 18 to some extent (see Table 9.2). In Voralberg, for instance, by far the largest areas participating in the agri-environmental programme are covered by the measures "Alpine pasturage and herding" and "basic measure", followed by "renunciation of silage fodder in certain regions" and "renunciation of means of production on grassland".

Measure	Total subsidised UAA (ha)	Total amount (million €)	Premium (€/ha)	
1. - Basic measure	1,973,816	100.23	<0.5 LU/ha	43.6
			≥0.5 LU/ha	72.7
2. - Organic farming	294,932	86.00	<0.5 LU/ha	250.7
			≥0.5 LU/ha	159.9
16. - Renunciation of silage fodder in certain regions	109,912	20.14	185.3	
17. - Keeping up of cultural landscape	203,623	41.20	inclination 25 – 35%	145.3
			inclination 35 – 50%	232.6
			inclination >50%	363.4
			mountain meadows	218.0
18. - Alpine pasturage and herding	486,446	23.06	dairy cows	159.9
			horses*	72.7
			cattle, sheep, goats*	50.9
			*additional herding premium	21.8

Table 9.2 – Some significant data related to the most important measures included within the Austrian Agri-Environmental Programme 2000-2006 as regards the support to mountain farming and cultural landscape maintenance. Period of reference: 2003. Source: Lebensministerium.

As a whole, in 2003 86 million Euros were granted for organic farming, 41.2 million Euros for the keeping up of cultural landscape and 23 million Euros for Alpine pasturage and herding.

Agri-environmental measures are co-funded by the European Union (50%), the Federal Government (30%) and the provincial governments (20%).

Likewise, most federal provinces started already in the seventies to assist mountain farms in their territories with direct payments in the form of farming premiums. The most important was the Alpine pasturing premium, a form of direct payment dependent on the number of animals driven up to Alpine pastures, aimed at ensuring the continued farming of Alpine grassland and the maintenance of cultural landscape, mainly for the benefit of tourist activities[1]. These premiums were firstly introduced by Vorarlberg and Salzburg (1972) and by the end of the seventies they were in force in all provinces but Vienna and Burgenland (i.e. the only provinces without any Alpine pasture). After EU accession, the Provinces introduced an additional premium for dairy farms within the Rural Development Plan, providing aid to cover increased costs of peripherally located dairy farms (e.g. on the basis of the distance from milk collection). The maximum amount of this additional aid (named "Area Aid 3") is limited to 2,000 Euros per holding per year.

Finally, even some tourist municipalities pay additional alpine husbandry and mowing premiums to local mountain farmers in order to maintain characteristic landscape features which often represent their main tourist attraction.

9.2.2 – Regional planning[2]

Along with the subsidy-based policy aiming at providing direct financial support to mountain farmers, an integrated regional policy approach has been undertaken at the same time. In particular, given the strong mountainous character of the country, regional development in the uplands and its impact on the landscape have been among the main priorities of economic and regional policies in Austria for many decades.

The first initiatives, undertaken already during the sixties, aimed at building up the infrastructures and establishing new economic enterprises in rural areas, by organising health

[1] Federal Provinces' mountain farming premiums were actually significantly higher in certain Provinces such as Tyrol and Voralberg, which are also the most popular tourist destinations. To give an example, in 1993 the average total payment per farm in Tyrol was more than six times as much as the average premium provided in Styria.

[2] This paragraph is substantially based on a number of interviews with a LEADER+ manager and members of the staff from the Federal Institute for Less-Favoured and Mountainous Areas, as well as on the following documents: Dax, 1997; Hovorka, 1998; Dax, 2001; Dax, 2002; Dax and Hovorka, 2003.

facilities, schools and higher education centres, road and telephone networks. The main goal was to fill the deep socio-economic gap between urban and rural areas by providing exogenous inputs aimed at promoting regional growth in economically weak regions. It was clearly a form of planning policy dominated by a top-down approach, which turned out to be somehow effective in reducing certain regional disparities in living conditions, although these remained quite significant by the end of the seventies, when strong differences between central and peripheral "poles" were still in place.

By that time, the economic prosperity which had made possible such a great availability of public investments had already started to slow down. Moreover, heavy criticisms arose about the previous model of regional policy and its instruments, which had in the meantime become out-of-date.

In some marginal mountain regions the first experiments towards a different, innovative regional development scheme were initiated by pioneer groups of activists, who started operating in the agricultural areas as producers and in the urban centres as consumers. Producer-consumer associations carried out a number of initiatives both in practical terms (e.g. direct sale of certain products at farmer's price) and on a more theoretical level, by putting in motion a political debate which later led to the development of a new ideological framework around the key concept of "independent regional development" (e*igenständige Regionalentwicklung*, ERE)[1].

The former philosophy based on material investments was thus overcome by this concept, whereas new emphasis was given to support measures aimed at exploiting the "endogenous potential" of each region, expressed in terms of internal regional resources and strengths. Such a new ideology implied a shift from a top-down to a bottom-up regional policy approach, directed to actively involve local stakeholders in decision making processes. The core measure for enhancing such a bottom-up approach was the provision of training through regional consultants since the beginning of the eighties. A regional consultancy structure was started up through the establishment of the Austrian Consultancy for Independent Regional Development (*österreichische Arbeitsgemeinschaft für eigenständige Regionalentwicklung*, ÖAR) in 1983, which acted as advisory body for local and regional development issues as well as a platform for the exchange of ideas and the promotion of socio-cultural activities.

[1] Particularly important for the establishment of an organisational basis for the promotion of new development approaches was the Austrian Mountain Farmers Association (*österreichische Bergbauernvereinigung*, ÖBV), founded in 1975 by a group of young farmers.

Differently from sectorial and functional strategies of development – usually characterised by a sort of exogenous and geographically-neutral problem-solving activity –, independent regional development implies an area-based socio-political concept. To this end the Special Initiative for Mountain Areas, later referred to as the Aid Initiative for Independent Regional Development (*Förderungsaktion für eigenständige Regionalentwicklung*, FER), had been established in 1979 with the objective of improving regional economy by supporting cooperative business community projects in all economic sectors at local level. In particular, concrete plans were implemented in some of the most peripheral and economically backward mountain areas. Thanks to their multi-sectorial approach, these actions also gave an important contribution in raising awareness about ecological issues and cultural landscape preservation. However, this initiative gradually shifted from investment to consultancy aid, to the point that in 1990 it was transformed into a limited liability company (GmbH) providing services on the basis of contracts.

Nevertheless, even the concept of independent regional development somehow held intrinsic development-inhibiting elements, e.g. by overstressing autonomous orientations, by underestimating the vital role of external relations and integration within both national and international context and by overrating endogenous potential.

Consequently, the more comprehensive concept of "endogenous renewal" as main regional perspective gained growing importance since the beginning of the nineties. This concept, which combined the basic idea of "independent regional development" with a more marked "innovation-oriented" strategy, placed adaptation strategies, know-how transfer, enterprise and technological innovations as the key factors for a successful business and regional, market-oriented economic development. While the "independent regional development" policy covered a whole range of initiatives, with a great emphasis on socio-cultural measures focusing on local identities, economic development and competitiveness enhancement became the main priorities under the "endogenous renewal" strategy, which also implied a remarkable opening attitude and the understanding of the region as a system characterised by a network of internal and external interactions.

Throughout its implementation, regional planning policy has succeeded in exploiting new development potentials, reducing regional disparities and significantly slowing down the negative economic and social trends affecting large mountain regions. Yet, despite these positive effects, regional policies as a whole have not been sufficient to thoroughly compensate for the disadvantages of the remotest areas.

The experience gathered with the latest approach of innovation-oriented, network-based regional policy has been exploited to a great extent in the implementation of the EU-programmes after the accession in 1995, such as the LEADER community initiative. Innovative actions in rural development are now heavily influenced by local initiatives and carried out within the LEADER+ programme, characterised by a high rate of participation: currently 32 Local Action Groups comprising more than 400 local authorities take part in this programme. Nowadays, the philosophy of the LEADER framework corresponds to a large extent to the integrated approach of endogenous development that has been followed in Austria since the beginning of the eighties. The Austrian Consultancy for Independent Regional Development, for instance, nowadays acts as the service bureau for the Austrian LEADER network.

Yet, their basic theoretical character is exactly one of the main weaknesses threatening the effectiveness of the LEADER programmes: while they represent a sort of laboratory of new ideas and project planning, investments are lacking as regards their concrete implementation. We may say that a fruitful activity of "software" development is not supported by a proper "hardware" equipment.

9.3 – Why has Austrian policy been successful?

As a whole, Austrian mountain policy has been successful in halting or even preventing marginalisation processes from taking place. While permanent out-migration, decline of mountain farming and land abandonment started to emerge as a problem after the Second World War, they have been stopped or significantly lessened by means of an effective subsidy-based system and a long-lasting bottom-up regional planning policy. Nowadays demographic trends, data regarding farming activities in the mountains as well as forest expansion show that these phenomena are not an issue in most of the Austrian mountain territory, while they are occurring just on a very limited scale in some remote areas and along border regions in particular (Wiesinger and Dax, 2005; Bacher, Hoppichler, Hovorka and Wiesinger, personal communication, 2005). Yet, although marginalisation is not seen as a critical topic at the moment, according to many experts it might become a problem in the middle or long-term in more regions, particularly if the socio- cultural and economic circumstances will change mainly because of the current globalisation trends (Wiesinger and Dax, 2005).

At present, although spot formed farmland abandonment does occur within many farm holdings, where small plots of land are taken out of production (e.g. very steep or not easily accessible Alpine meadows), large-scale land abandonment does not take place. As already

mentioned, land use change is actually a far more common process than land abandonment, the most frequent land use changes being from arable lands to grasslands, from meadows to pastures and from mown meadows to managed woods. Accordingly, from a structural point of view the greatest change is the shift from full-time to part-time farming, which also implies a shift from more labour intensive to less demanding farming practices, e.g. from dairy cattle to suckler cow husbandry or from mowing to pasturing.

The reasons for such an overall positive outcome are numerous, and cultural, social, economic and environmental factors contribute to this. Above all, it is important to keep in mind that marginalisation and land abandonment, although not representing an issue, are however perceived as a potential threat to rural mountain areas. It is actually reasonable to assume that mountain areas would suffer from these processes if specific proactive political strategies were not implemented, since Austrian mountain regions face very similar conditions to other Alpine areas, e.g. in Italy, which are nowadays heavily affected by depopulation, overageing, marginalisation and land abandonment.

Some of the main ingredients of such a success are listed below.

Targeted subsidy-based policy, highly differentiated rates of payment and support to part-time farmers

As regards subsidy-based policies, it has to be observed that before and after EU accession, following the suggestion provided by Reg. 1257/99, Austria has always adopted a very high degree of differentiation in the payment scheme in order to effectively target support. Austria has actually one of the highest ranges of compensatory allowances' payments among Member Countries: rates of payment per ha vary from 7 to over 600 Euros, with the highest payments directed at very small livestock farms in the most disadvantaged areas (CJC Consulting, 2003; Hovorka, personal communication, 2005). Since the level of support per farm is very heavily dependent on the degree of farming difficulty measured according to the number of mountain farm registry points, the support differences reflect the real level of difficulty, which is usually proportional to the contribution to the maintenance of cultural landscapes' traditional features.

The differentiation of the support level according to the degree of farming difficulty on individual basis is of greater importance to agricultural enterprises than the classification of a farm as simply being within a Less-Favoured Area, as it is in most of other Member Countries, including Italy (Hovorka, 2004).

To this regard, a comparison might be interesting between the Austrian system and the LFAs compensatory allowances' system as provided by the 2000-2006 Rural Development Plan for the Veneto region (see Paragraph 5.2). In the latter case, no differentiations are provided, whereas subsidies are granted to the same extent (i.e. the maximum amount set by the Venetian Annual Development Plan), independently from farming conditions (see Table 9.3).

Similar is the situation as regards Austrian agri-environmental programme, which comprises several different measures aimed at supporting mountain farming and particularly the maintenance of mown meadows and Alpine pastures. On the other hand, the Venetian Rural Development Plan contains only one measure specifically targeting these mountain ecosystems; premiums and criteria are reported in Table 9.3, along with the conditions applying to the analogous measure provided by the Austrian Rural Development Plan. In this case, the higher amount of premium granted to Austrian farmers is fairly evident.

Undifferentiated or very low differentiated premiums do not effectively support farmers more in need, while at the same time do not represent a determinant incentive for other farmers to undertake or maintain costly productive forms of farming such as extensive livestock husbandry.

<table>
<tr><th></th><th colspan="3">Veneto (Italy)</th><th colspan="2">Austria</th></tr>
<tr><td rowspan="3">LFA's compensatory allowance[1]</td><td colspan="3">200 €/ha for the first 45 ha of forage UAA</td><td colspan="2" rowspan="3">From 7 to over 600 €/ha

according to the difficulty of farming measured through the number of mountain farm registry points</td></tr>
<tr><td colspan="3">150 €/ha up to a maximum of 60 ha of forage UAA</td></tr>
<tr><td colspan="3">0 €/ha from 60 ha of forage UAA onwards</td></tr>
<tr><td rowspan="5">Conservation and restoring of mown meadows and pastures (agri-environmental programme)</td><td></td><td>Gentle slopes</td><td>Steep slopes</td><td>Slope gradient</td><td>Premium</td></tr>
<tr><td>Pastures' maintenance</td><td>45 €/ha</td><td>84 €/ha</td><td>25 – 35%</td><td>145.3 €/ha</td></tr>
<tr><td>Pastures' restoring</td><td>78 €/ha</td><td>129 €/ha</td><td>35 – 50%</td><td>232.6 €/ha</td></tr>
<tr><td>Maintenance of mown meadows</td><td>75 €/ha</td><td>145 €/ha</td><td>> 50%</td><td>363.4 €/ha</td></tr>
<tr><td>Restoring of mown meadows</td><td>104 €/ha</td><td>173 €/ha</td><td>Mountain meadows</td><td>218 €/ha</td></tr>
</table>

Table 9.3 – Amounts of LFAs compensatory allowances and agri-environmental premiums for certain measures specifically targeting mountain meadows and Alpine pastures provided by the Veneto's and the Austrian 2000-2006 Rural Development Plans. As regards agri-environmental programme, Measure 6, Sub-measure 6.2, Action 12 of Venetian Rural Development Plan and Measure 17 of Austrian Agri-environmental Programme (ÖPUL) have been considered respectively. Sources: Regione del Veneto, 2000; CJC, Consulting, 2003; Austrian Agri-environmental Programme (ÖPUL).

[1] While in Veneto LFAs compensatory allowances are provided just in case the farm runs zootechnical activities, in Austria premiums are differentiated whether the holding is a livestock farm or not (see Paragraph 9.2.1).

According to a recent study evaluating the effects of the Austrian agri-environmental programme (ÖPUL) in mountain regions, ÖPUL and LFAs direct payments gave an essential contribution to maintain the cultivation of extensive grasslands and Alpine pastures in particular, since without the programme many small-scaled mountain holdings would have to give up farming (Groier, 2004b; Groier, personal communication, 2005).

As regards the granting of premiums within LFAs scheme, it should also be noticed that part-time farmers, who are not eligible for LFAs support in several countries, they are equalised to full-time farmers in Austria, where they are believed to give equal contribution in terms of maintenance of cultural landscape and provision of social and ecological services. This measure, together with other forms of encouragement towards part-time farming and the starting up or development of various kinds of on-farm non-agricultural activities (e.g. agri-tourism or handicraft) have allowed a dramatic increase in part-time farming (see Paragraph 9.1) by providing an alternative beyond the dualism "farming as the main activity" versus "farmland abandonment", which often leads to the latter choice[1]. For this reason the maintenance of the equal treatment of full- and part-time farmers was one of the core issues in the negotiations before EU accession. While subsidies and an however effective planning policy can hardly succeed in avoiding giving up of full-time farming, they might be determinant in encouraging the continuation of farming through a part-time activity, thus maintaining the positive externalities it provides. For this reason diversification, pluriactivity, multifunctionality of agriculture and promotion of off-farm and on-farm non-agricultural activities have always been of primary importance within mountain policy.

Beyond enabling continued farming on a part-time basis, the subsidy-based policy providing financial support to mountain farmers has actually had positive effects on the economic development in the mountains as a whole, such as: positive income effects through the direct payments to mountain farmers; stabilising effects on the local employment market; support for economic diversification of rural households; providing services for tourism, and so on (Hovorka, 1998). The existence of a regional economy capable of development actually makes a fundamental contribution to maintaining agriculture in these regions, mainly by providing complementary activities and earnings to part-time farming (OECD, 2002; Hovorka, personal communication, 2005).

Nevertheless, the present agrarian structure model is likely to radically change in the next future, due to several reasons. First of all, many part-time farmers are factory workers, postmen or

[1] Several studies indicate that local socio-economic conditions and opportunities for employment outside agriculture have a major influence on the viability of farming in many marginal areas (Baldock *et al.*, 1996).

railwaymen: yet, this kind of nine-to-five jobs will soon decline or even disappear from many rural areas, because of the privatisation process currently in progress. In any case, the availability of spare time for any kind of job is now dramatically decreasing, while a greater flexibility is required, so that the maintenance of an extra activity is becoming harder and harder. In particular, well-educated people are the most likely to abandon farming practices, for a number of reasons, such as the often great distance between their hometown and the working place, the higher economic level which reduces the necessity or the stimulus to an extra-job, the higher cultural background lessening the availability to keep on farming (Hoppichler, personal communication, 2005). According to a recent survey, 60% of interviewed people think that within next generation radical changes will occur as regards Austrian agrarian structure, which has remained substantially unchanged for the last few decades (*ib.*).

Austria only joined the European Union in 1995, which means that it avoided the period during which most of the EU agricultural incentives were productive-oriented and favoured intensification, i.e. basically before 1992. Afterwards, it obtained a 10-years transition period and finally it enjoyed the Agenda 2000 reform, which somehow brought Austria back to the regime in force before 1995, when the direct payments were highly differentiated and targeted towards small holdings facing a high level of farming difficulty. From this point of view, we may say that Austrian mountain farmers are privileged within the European countries.

Moreover, as already mentioned, CAP second pillar measures have been given greater priority than first pillar measures, accounting for only 35% of the overall CAP budget. Consequently, while market measures contributed barely 24% to public support per farm unit in mountain areas (47% for non-mountain areas), agri-environmental payments and compensatory allowances together accounted for 63% (42% for non-mountain farms). Austrian agrarian policy has actually always posed as a priority the maintenance of a large number of farmers in disadvantaged areas and mountain regions in particular, which would not be possible only by means of CAP market measures (Wiesinger and Dax, 2005).

It is finally worth reminding that direct payments provided under the Rural Development Plan or, before EU accession, within the Mountain Farmers Special Programmes, can be classified as simple compensations for the more difficult living and working conditions in disadvantaged areas, which means that they are categorised as "green measures" according to the World Trade Organisation (WTO) rules, as their effect is production-neutral (Hovorka, 1998).

Integrated, holistic and bottom-up regional planning policy

As regards regional planning, the approach to mountain areas adopted about three decades ago aimed at a holistic, non-sectorial solution of problems (Dax, 2001). Accordingly, planning and development policy tasks have not been fully separated, either territorially or sectorially.

To this end, since 1971 Federal Government, Provinces (*Länder*) and local authorities have promoted together the Austrian Conference on Spatial Planning (*österreichische Raumordnungsskonferenz*, ÖROK), a powerful non-statutory body in which social partners are also represented. The ÖROK plays a key role for the co-ordination of regional policies, within the framework of which a nation-wide basis for an integrated spatial economics and regional policy is being developed (Hovorka, 1998; Dax, 2002). Since its foundation, the ÖROK has paid special attention to the spatial development of peripheral regions and to the formulation of integrated development policies (Dax, 2002), showing high consideration for the contribution of mountain farmers to the viability of rural areas and the maintenance of cultural landscape.

Mountain Farmers Special Programme in particular is an outstanding example of an initiative linking spatial development and regional policy aims with sectorial policy objectives in a clearly defined mountain area (Hovorka, 1998). The underlying idea was that agricultural problems in mountain areas cannot be solved by agricultural policy measures alone, while there is a need for a conceptual integration of regional, structural and spatial planning policy measures, as well as a graduated application of production, market, price and aid policy (*ib.*).

In some areas, for instance, the promotion of organic farming in combination with regional processing and direct or regional marketing, eventually integrated in regional development projects like LEADER+, has proven to be a successful strategy (Groier, 2004b).

Educational and socio-political measures have also been of great influence: since the seventies mountain policies have largely been inspired and enhanced by bottom-up activities and regional rural policies on a small geographical scale. Indeed local stakeholders' commitment and their integration into the national institutional framework heavily influences policy design with regard to sustainable mountain development, although the independent character or regional and local authorities is always to be maintained (Dax and Hovorka, 2003).

High level of acceptance and political consensus and other socio-cultural factors

Socio-cultural factors are of outstanding importance, although they are not sufficient to fully explain the reasons for an overall favourable context. Concerns for the preservation and promotion of the cultural landscape in the mountains are shared by a large majority of the

Austrian population (Hovorka, 1998; Dax and Hovorka, 2003; Wiesinger and Dax, 2005; Hovorka, Wiesinger, Groier and Hoppichler, personal communication, 2005). This attitude has been confirmed by several opinion polls (Hovorka, 1998). Consequently, there is a widespread social and political consensus that peripheral areas should not be left unmanaged or managed entirely by their own (Dax, 2001).

There is actually a surprisingly high level of acceptance and support among the Austrian population for providing public funds to agricultural and forestry enterprises – mountain holdings in particular – in order to enable them to fulfil the socially desirable functions of farming (e.g. protection against natural hazards, preservation of biodiversity and so on) (Bacher and Wirth, personal communication, 2005).

Surveys also show that farmers themselves display an increasing awareness of their role in caring for the landscape, although the productive function is still crucial for most of them (Bacher and Groier, personal communication, 2005).

While at the beginning (i.e. in the seventies) the main reasons for consensus were the very poor socio-economic conditions affecting mountain farmers, in the following decades environmental concerns started to prevail and above all the role of farmers as "mountain keepers", preventing and avoiding damages caused by natural hazards, was emphasised. During the eighties, when environmental issues came to be regarded as major problems, an "eco-social agricultural policy" (*ökosoziale Markwirtschaft*) was developed, which posed environmental concerns as an essential factor in any discussion on agricultural policy (OECD, 2002).

Lately, also the importance of mountain farming in maintaining and shaping the landscape and its value as tourist asset gained considerable worth. When changes to the cultivated landscape affected the sphere of interest of tourism and leisure industry, the problems of the loss of typical landscape features, together with the disappearance of valuable habitats and ecosystems, have been the subject of major public discussions, which were also rooted in the direct experience of Austrian people (*ib.*), for the largest majority being tourists themselves.

However, the social consensus has not at all to do with economic purposes connected with tourism alone: keeping the landscape open is considered a top priority among common people and a high existence or traditional value is often attributed to the typical cultivated landscape and especially to traditional agricultural and forestry practices by local inhabitants as well (*ib.*).

The high level of acceptance is not only due to socio-cultural reasons, such a sort of natural tendency towards mountain areas characterising Austrian population. On the contrary, it also results from a conscious political strategy aimed at raising awareness and building consensus.

This policy already started in the seventies through several initiatives, such as the establishment of the Special Initiative for Mountain Areas, the Austrian Consultancy for Independent Regional Development, the Austrian Conference on Spatial Planning and – more generally – all those initiatives, promoted by the federal and provincial governments but implemented at decentralised level, aiming at raising awareness about the importance of maintaining settlements and agricultural activities in the mountains and their concern to the whole society.

Another crucial socio-cultural aspect is given by the fact that farmers are acknowledged a rather appreciable social status, so that the problem of lack of successors has just recently started, due to an overall change in life expectations (see Paragraph 3.2.2). Nevertheless, the feeling of rootedness to the territory is very high, and taking care of one's own land is still largely perceived as a duty (Hovorka, Groier and Hoppichler, personal communication, 2005).

Likewise, farming and even animal husbandry are largely practised as part-time activities or even as a hobby by people from every social class, including well-off people, e.g. many Tyrolean hotelkeepers. It was also such a positive attitude towards agricultural activities which gave a decisive contribution to the widespread diffusion of part-time farming in Austria.

Also the laws of inheritance play an important role in determining farming viability: although differing in the various Austrian regions, according to the most common rules only one single heir is allowed to take over the whole property. However, even in those areas where the estate is usually subdivided among several heirs, such as in some Tyrolean valleys, farm abandonment is extremely rare, thanks to the strong value still associated to family tradition (Hoppichler, personal communication, 2005).

A comprehensive vision of mountain areas

In Austria mountain areas are not seen just as the supplementary space for the population living outside the mountain region, or a sensitive eco-system to preserve as much as possible, but above all as a living and working space for the local population (Dax, 1997; Hovorka, 1998). Accordingly, most of mountain policy has been targeted towards the overall viability of mountain areas.

In particular, preservation of farming and forestry in the mountains has been set as a top priority by the Austrian federal government (Austrian Federal Ministry of Agriculture and Forestry, 1996). Landscape preservation and overall regional development are actually conceived

as an effect of mountain farming support, whose multifunctional aspect has always been stressed by Austrian economic and territorial policy from a very early stage (Dax and Hovorka, 2003).

Moreover, the successful realisation of innovative, ecologically and socially acceptable projects conferred a certain pioneering role on the mountain areas in ecology- and innovation-oriented development (Hovorka, 1998), thus lessening their usually peripheral role.

Large extension of mountain areas

Given the very high share of mountain territory, Austrian government decided to make use of rural development financial aids mainly targeting mountain farmers, although neither LFAs compensatory allowances nor agri-environmental premiums were originally thought as specific for mountain areas.

In Italy, for instance, large part of the southern regions are defined as Less-Favoured Areas, while in Austria 81% of the federal territory is covered by LFAs, 70% of which being mountain areas. However, we should not forget that 54% of Italian national territory can be considered as mountainous according to the UNCEM criteria (see Paragraph 2.1): therefore, large extension of mountain areas does not automatically imply high concern for mountain territories, while this factor needs to be accompanied by the awareness of the key-role played by these areas.

Tourist structure

The Austrian tourist industry is characterised by a predominantly small-business structure. Its development was consciously promoted through the widest possible distribution of tourist income in economically disadvantaged areas and the maintenance of the economic independence of the resident population, particularly in the interests of keeping population and agriculture in peripheral areas of the Alpine mountain regions (Dax, 1997; Hovorka, 1998). Nevertheless, by no means tourism is evenly distributed throughout the Austrian Alpine arch, while a strong polarisation is still in place (Hovorka, 1998; Dax and Hovorka, 2003).

However, agriculture and tourism are closely connected: without the input provided by agriculture, Austria's tourist industry could not offer its major asset, i.e. a well-tended cultivated landscape. On the other hand, without the value added created by tourism, agriculture would presumably be exposed to an even substantially higher economic pressure and consequently to a higher rural exodus (OECD, 2002).

CHAPTER 10 – LAND USE MANAGEMENT AS A RESPONSE TO COUNTERACT LAND ABANDONMENT AND SPONTANEOUS AFFORESTATION: SOME EXAMPLES

Chapter 10 presents some case studies where land abandonment and/or spontaneous afforestation are halted by means of particular land use management practices, whether these are specifically aimed at achieving this result or, on the contrary, such an outcome is just an indirect effect. Although the extent and significance of these initiatives cannot be posed at the same level as those associated with the large scale policy measures described in the previous Chapters, nevertheless their impact at local level may be significant.

Below two kinds of land use management will be described, concerning hunting and water management respectively.

10.1 – The potential role of hunting

10.1.1 – The Scottish Highlands

The former case-study is represented by the Scottish Highlands, where historical and environmental conditions contributed to shape a bare landscape dominated by moorland.

As regards historical circumstances, these have mainly to do with the Scottish property right and land owning system, characterised by large estates, which are still owned by a small number of landowners. This farming system holds ancient historical roots: during the Middle Ages, the king used to grant land to his military supporters and to the church, the basic unit of landholding being one knight's service or fee. The system developed in the medieval period continued for several hundred years. From the late 1700s landowners began to give long leases to tenants who were willing to carry out farm improvements. This led to a change in the status of the tenant farmer and the farm worker: farmers became fewer and richer, farm workers became fewer and poorer, because of the new machinery introduced.

At the beginning of the 19th century sheep became so popular and convenient that farmland was converted to pasture for sheep to graze. As a result, landowners displaced people who once farmed that land (the so-called *clearances*). From about 200 years ago more and more people left the countryside and moved to towns to work in the fast growing secondary sector. Sheep grazing found a proper environment to spread: ten million acres of forests had actually already been reduced to bare grassland by the mid 18th century, as timber merchants had turned to the Highlands for supplies, once the lowland forests had been largely exhausted.

Beyond the harsh climate and the poor soil conditions, which slow down the process of secondary succession without stopping it at all, nowadays the main factor halting spontaneous reafforestation is the impressive number of sheep, on the one hand, and deer (about 300,000), on the other hand, grazing throughout Scotland (Hester, personal communication, 2005).

Deer number significantly increased with the creation of royal hunting reserves in the Middle Ages. Nowadays, the number of deer is artificially maintained high, since they are at the core of a flourishing and well-organised "hunting industry", which in many cases represents one of the scarce working opportunities for the few inhabitants left. Hunting in Britain in general is an elite sport: both local and foreign hunters are usually well-off people willing to pay for a package of services, ranging from guidance to accommodation (Price, personal communication, 2005).

On the other hand, deer represent a true pest from the environmental point of view, since their massive presence does not allow tree vegetation, and particularly native woodlands, to grow, as wished and sometimes even actively encouraged by environmentalists and biologists.

Native woodland is actually still covering less than 5% of the land area of Scotland, while it could probably cover 50% of the whole territory in relation to climatic and soil requirements. However, the spread of birch and pine woodland into moorland is one of the main trends in land cover change currently taking place in Scotland. As native woodland cover is low, then in biodiversity terms this increase in woodland extension is mainly considered as beneficial both by researchers and politicians, although many local communities are no familiar with such a new landscape feature, which disappeared from the Highlands already several centuries ago, while reforestation is very much associated with plantations traditionally carried out by the Forestry Commission for commercial purposes[1]. For this reason financial aid is provided by the government for planting and/or for fencing areas where natural regeneration of native woodland is both possible and desirable. Thanks to public financial support, forest extension slightly increased during the last decade (see Figure 10.1).

As already mentioned, researchers are mostly in favour of this trend. Preliminary results from the research project MOORCO (Moorland colonisation by birch and pine and the consequences for biodiversity), for instance, display that natural succession is a positive trend as long as it is controlled, i.e. not allowed where there are rare habitats of high biodiversity importance. However, though already largely extended, moorland also has value in conserving biodiversity (e.g. heather moorland) and the organic moorland soils are an important store of soil carbon.

[1] Scot's pine (*Pinus sylvestris*) is the only native British conifer grown for timber. Many other conifers, imported mainly from Europe and western North America, are now widely planted for commercial purposes.

Consequently potential optimal trade-offs are to be found between conserving such ecosystems and replacing them with woodlands. Such a trade-off is hardly achieved, because plantations and natural regeneration are possible only on governmental land or wherever landowners agree on that. On the other hand, there are large territories which are managed mainly for sheep grazing or deer hunting, where overgrazing reduces or even prevents any possibilities of restoring tree cover.

Figure 10.1 – In the Scottish Highlands native woodlands artificially planted or naturally regenerated need to be protected by fences against deer and sheep

Although the outcome obtained in the Scottish Highlands is not desirable, a compromise between the two extreme situations (bare land in Scotland and continuous forest expansion in the Italian Alps) would be a good solution to pursue. This result might be achieved by enhancing and controlling (e.g. by means of fences and/or selective hunting) at the same time the presence of certain game species, which might thus be used as a tool for limiting tree encroachment and improving socio-economic conditions of local communities.

10.1.2 - Environmental improvement measures for the wild fauna

In comparison to the former case, an intermediate situation can be found, for instance, in Ca' Domenicali, a private hunting reserve in the Apennines (Province of Bologna) where low hunting pressure combines with an optimum land use management including maintenance of arable crops, mown meadows, extensive grazing, pastures, open land, ponds and small plots of cultivated woodland (see Figure 10.2).

Figure 10.2 – The private hunting reserve named Ca' Domenicali (Province of Bologna, Italy). Author: A. Monaco

These measures are specifically aimed at avoiding shrub encroachment and maintaining the variety of the landscape, in order to eventually favour the presence of game. The outcome is given by 1,350 hectares of land characterised by an extreme variety of landscape and an impressive wild fauna, in terms of number of both animals and species. Particularly common are wild boars (*Sus scrofa*), roe deer (*Capreolus capreolus*) and several kinds of hares, tetraonids and birds of prey. Apart from the ungulates, all of the other species need open ground habitats such as grassland.

Before 1987 the land was occupied by a farm running semi-intensive zootechnical activities, while afterwards it passed through a 5-years period of abandonment, during which the land was no longer exploited for any productive purposes, being only occasionally utilised as a private hunting reserve. Since 1992 the whole area has been subject to a range of interventions under the supervision of the Italian National Institute for Wild Fauna (Istituto Nazionale per la Fauna Selvatica, INFS), which used it for testing the effectiveness of the then so-called "environmental improvement measures for the wild fauna" (nowadays mainly referred to as "habitat management

for faunal purposes"), consisting in "improving" environmental conditions of deteriorated habitats in order to favour certain target species (Monaco and Genghini, personal communication, 2004).

Most of these techniques are aimed at halting shrub and tree encroachment taking place in abandoned fields and pastures, since open landscape is necessary for several game species such as most of tetraonids. The interventions only apply to recently abandoned farmland, thus not implying the conversion of new areas to this land use. Their extension is usually very limited.

While initially the main field of application was hunting, i.e. these measures were basically aimed at enhancing game presence in certain "faunal-hunting reserves" (in Italian called "riserve faunistico-venatorie"), later on the original scope was somehow extended, and nowadays they are implemented also for conservation purposes. However, even in the former case the results obtained are very promising, since it has been observed that individuals belonging to the target species usually appear more frequently in such hunting reserves than in the rest of the territory[1] - where hunting is equally allowed, according to the Italian legislation - (Genghini and De Berardinis, 1999; Genghini, personal communication, 2004), including some protected areas where specific measures for wild fauna are not implemented[2]. The limiting factor for most of the mentioned species is actually not so much the hunting pressure, as the progressive contraction of their habitat, mainly due to recolonisation of semi-natural open habitats by vegetation. To this end, according to the Italian Act No. 157/1992, local authorities are to provide financial support for the implementation of environmental improvement measures (Genghini, 1994): in many cases hunters' associations are granted, e.g. for mowing abandoned meadows in mountain areas.

The opportunity offered by these measures, which are often encouraged and even subsidised by the European Union (e.g. through the *set-aside* scheme, in particular when cultivation of land is not completely suspended, but its main function simply shifts from commercial production to food supply for the wild fauna), have been recently explored through several studies; the most frequent target species are tetraonids (Bottazzo *et al.*, 2004; Genghini, 2004; Rotelli, 2004).

The implementation of measures aimed at preventing shrub and tree encroachment in order to create favourable conditions for game species is potentially sustainable from an economic point of view, since many people are likely to be willing to pay for that, e.g. through hunting licences.

The conservation of open ground habitats might thus curiously represent a common ground to mountain communities, environmentalists and hunters.

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[1] Moreover, since game is *res communitatis* according to the Italian legislation, it suffers from the prisoner dilemma affecting every common: yet, the negative consequences of the dilemma are less marked in the case of private faunal-hunting reserves, where hunting is practised just by a limited number of people, who also pay for that.

[2] In Austria, for instance, the density of ungulates is the foremost effect of hunting management activities (Wiesinger and Dax, 2005).

10.2 - Mountains as water towers: the case-study of Schwarzau im Gebirge (Austria)[1]

Schwarzau im Gebirge (Neunkirchen district, Province of Lower Austria) is a mountain municipality, located at 617 m above sea level in an extremely remote and isolated valley (see Figure 10.3). The whole area has been threatened by marginalisation and abandonment for several decades, mainly for geographical reasons, since the way of access to the valley is constantly monitored and subject to occasionally closures due to the high risk of avalanches and snowslides in wintertime as well as floods and landslides in summertime. Moreover, public transport connections offer a very poor accessibility to the hamlet[2].

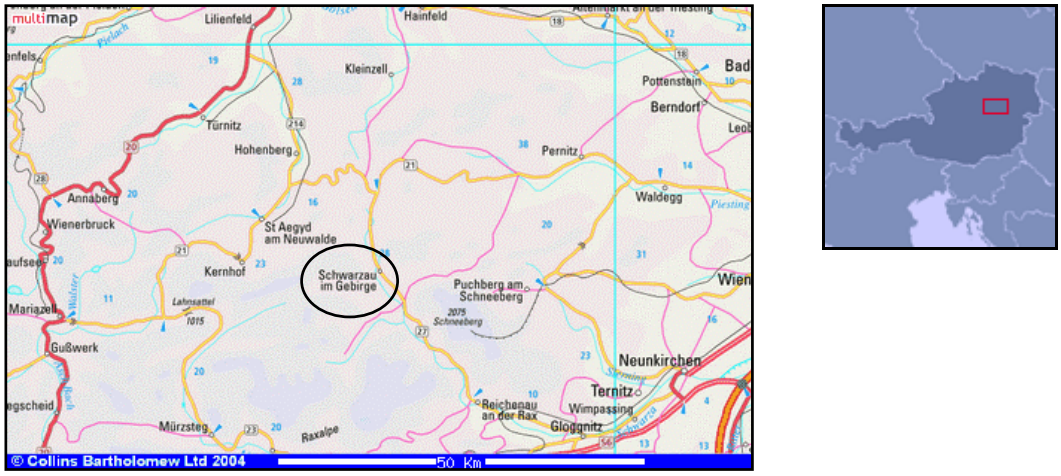

Figure 10.3 – Location of Schwarzau im Gebirge (Neunkirchen district, Province of Lower Austria)

Population has dropped by 28.5% over the last 30 years (and even 48% since 1923). In particular, it has been estimated that the municipality has lost 2.9% of its population from 1999 to 2001 because of out-migration processes. Since the exodus mostly involves young people, the rate of people aged over 60 is rather high (24.8% in 2001).

Population density is nowadays 4.4 inhabitants per square kilometre. Although there is still a sufficient provision of basic infrastructures (health centre, primary and secondary school, gas station, bank), the on-going privatisation process together with the growing out-migration could cause their closing down in the next few years (e.g. the post office has just closed).

Forests have always been the main land cover. The most important economic activities in the past actually relied on forests (e.g. timber and charcoal production), so that forestry already has a very long tradition within the municipal territory. Yet, forest extension increased by 14.5% from 1927 to 2001 (5.6% just in the last decade of the 20th century), so that forests and woodlands nowadays cover more than 90% of the whole area.

[1] Information provided in this paragraph is based on some interviews with members from local authorities, a field trip and the Austrian case-study report within the EUROLAN project, edited by Wiesinger and Dax in 2005.
[2] Yet, the municipality subsidizes a local taxi enterprise, in order to improve the mobility of people not able to use their own car.

While arable land can no longer be found since many decades, the share of grassland decreased by 11.4% from 1970 to 1999. During the same period the number of Livestock Units declined by almost one third (-50.3% as regards cattle units)[1], whereas the number of agricultural holdings dropped by 40%. Meanwhile, the number of pluriactive farms (i.e. farms running other activities beyond farming) increased by 12%, which means that diversification strategies have been successfully applied: nowadays the share of part-time farms is as high as 70%. Most of part-time farmers are employed in non-agricultural activities outside the municipal territory: the ratio between people commuting out and people commuting in is about four times, which means that a high share of economically active inhabitants are employed outside the municipal territory (44%). Nevertheless, despite its remoteness, there are also some people commuting in daily.

Despite the overall good state of the environment, tourism is hardly developed within the valley for several reasons: the area is geographically isolated, people usually adopt an aloof behaviour with visitors and finally tourist assets are rather poor, thus hardly competitive with other famous Austrian mountain tourist resorts.

Although depopulation and out-migration are still heavily affecting the community, these trends are not as marked as they are supposed to be, thanks to the greatest capital in possession of the community, i.e. water supply. Indeed, the municipal territory of Schwarzau im Gebirge comprises the main and oldest water reservoir for the City of Vienna: a pipeline was built as early as 1928 covering the almost 100 km of distance between the two settlements.

The City of Vienna is also the biggest landowner within the municipality, owning and managing 40% of the total area, equivalent to 8,000 ha. This area is subject to restrictions for drinking water protection. It is almost entirely covered by forests, which are managed in a sustainable way by the Viennese City Council, in order to prevent water pollution by safeguarding the quality of the water catchment basin[2]. Such a sustainable forestry management is necessarily labour intensive (e.g. machinery can hardly be used within the catchment basin in order to avoid land erosion); therefore, the City of Vienna is also the most important employer, since more than 100 among lumberjacks, forestry technicians and other permanent workers are employed within the municipal forestry department, out of a total population of 831 inhabitants in 2001.

[1] Nowadays cattle husbandry is limited to suckler cows, while dairy farming has come to an end eight years ago.

[2] Sustainable forestry guidelines provided by the local forestry department include for instance the following measures: no clear felling, natural tree regeneration, banning of spruce plantations, support to local species such as broad leaved and mixed forests, maintenance of a dense green undergrowth.

The relatively great supply of job opportunities is conceived by most of local people as well as by local authorities as a sort of compensation for the significant restrictions imposed by regulations aimed at protecting water resources. Nevertheless, there are also people thinking that the value of water resources is still underestimated.

These circumstances generated a virtuous circle and a sort of win-win situation, by which the City of Vienna assures a good water supply both in quantitative and qualitative terms, the complete abandonment of the settlement is prevented by the job opportunities provided, and finally forests are managed according to sustainable forestry management principles[1].

[1] However, it is important to recognize that other factors might also contribute to such a relatively positive outcome. Firstly, social capital is actually rather developed in Schwarzau im Gebirge, in terms of number of socio-cultural associations and provision of leisure activities, which improves the viability of the area. For this reason, young people are not usually looking forward to moving away, while they migrate only when they are forced to do so, e.g. for attending high schools or universities or looking for qualified jobs for well-educated people. Enhancing socio-cultural networks and improving the provision of facilities for local people are currently the municipality's main priorities. Secondly, the municipality takes part in the LEADER+ regional development programme, which is trying to further develop tourism in the whole district, although the initiatives concerning Schwarzau im Gebirge are rather limited.

CHAPTER 11 – CONCLUSIONS

As a whole, four main attitudes can be identified as regards mountain issues:

- *Negationism*: mountains are basically ignored or seen as a recreational space for the lowland dwellers at the most. Regional planners embracing this approach are mostly focused on urbanisation processes, while they are largely unaware of the threats faced by mountain areas, which in many cases are not even recognized as an issue to tackle;
- *Reductionism*: mountains are seen simply as a rural space and mountain issues are largely identified with farming issues. Agriculture is thus the point of view which is most frequently adopted when considering mountain policies, while socio-cultural and environmental concerns play a minor role. Such an approach has been dominating European mountan policy for several decades;
- *Sectorialism*: mountains are recognized as complex environments facing a whole range of problems. Yet, every single aspect is addressed from a sectorial point of view, while a holistic approach is lacking;
- *Naturalism*: mountain areas are mainly seen as "untouched" natural landscapes, in contrast with urban areas, representing the building environment. The prevailing anthropogenic component of European mountain cultural landscape (see Paragraph 6.1) is thus denied. As a consequence, mountain policies are mainly conservative, thus causing the interruption of those processes of co-evolution between humans and environment, which contributed to shape the current landscape. Along with negationism, such an approach prevails in Italy.

In order to avoid the espousal of one single attitude, a transdisciplinar approach has been adopted and the aim of integrated sustainability has been pursued.

Despite their extension and the fundamental role played within the modern societies by the resources and services they provide, mountain areas are facing marked marginalisation processes in industrialised countries all around the world, mainly in terms of depopulation and ageing trends, decline of farming activities and uncontrolled forest expansion (see Chapter 5). While the first two processes, i.e. demographic trends and – to some extent – mountain farming decline have been largely analysed by international research community, less attention has been paid to the main consequence of such processes at landscape level, i.e. forest expansion.

The process of natural succession following farmland abandonment has been actually widely underestimated, in terms of both its extent and the impacts it causes.

Yet, throughout Europe forest extension displays a gentle though steady increasing trend (in Western Europe, for instance, the forest area has increased by almost 30% during the second half of the 20th century), whereas in Italy land abandonment and the consequent invasion of forests into farmlands represents, from a quantitative point of view, the most important change in land use which took place during the last 60 years. In particular, forests expanded as much as artificial surfaces during the last decade of the twentieth century, a period traditionally associated with massive urbanisation processes (see Paragraph 5.3).

Two opposite outlooks are usually adopted as regards the processes so far described:

- the "*laissez faire*" approach, characterised by an overall positive and optimistic view of the phenomena, on the one hand;
- a more critical and proactive attitude based on the conviction that the current trends somehow need to be counteracted, on the other hand.

After considering the extent (see Chapter 5), the effects and the impacts (see Chapter 6) caused by land abandonment and uncontrolled forest expansion from an intersectorial and integrated point of view, the latter approach has been adopted (see Chapter 8).

Mountains are commonly referred to as disadvantaged areas suffering from remoteness, handicaps and depopulation, while their potentialities and assets are hardly highlighted. In order to promote an effective strategy for sustainable mountain development, a more positive and proactive vision is actually called for.

Below some key-principles are suggested, which are thought to be essential for the implementation of effective strategies aimed at addressing marginalisation-related trends in the mountains by preventing them or counteracting their effects.

Proactive strategy

While the need of a proactive approach is unanimously recognized as regards the conservation of cultural heritage, the prevailing opinion about natural heritage is that the best conservation strategy consists in leaving it as undisturbed as possible, thus letting it evolve without any significant constraint. By doing so the outcome is very likely to be undesirable from several points of view, such as:

- nature conservation: re-wilded habitats deriving from uncontrolled spontaneous afforestation processes are usually biodiversity poor (see Paragraphs 6.2.1);
- soil protection: these new forests are more prone to natural hazards, such as landslides, floods, avalanches and fires (see Paragraph 6.2.2);

- recreation: spontaneous afforestation of large patches of land usually leads to homogenisation and banalisation of the landscape, which also becomes less accessible and exploitable (see Paragraph 6.3);
- production: unmanaged secondary forests usually provides very poor raw material in terms of wood supply (see Paragraph 6.4).

On the contrary, valuable semi-natural systems such as those shaped and maintained by extensive mountain farming practices (see Paragraph 6.1) require proper planning strategies, by which they might be either preserved as such through the maintenance of farming activities and/or the implementation of specific interventions, e.g. aimed at preventing shrub encroachment (see Paragraph 10.1.2), or actively managed in a way that they are gradually directed to a certain state which is thought to be desirable from an environmental, social or economic point of view.

However, although finding overall strategies of land and biodiversity conservation might be extremely difficult, a common philosophy could be to maintain the highest value of the cultural landscape, because in many cases it is synonymous with optimal biodiversity (Farina, 1991).

Area-based integrated sustainable mountain development

Throughout the Alps economically backward remote areas coexist with areas characterised by strong economic development, mainly based on the secondary or tertiary sector. In this case a sort of "de-mountainess" process occurred, since such a boost was often based on urban development models, which contributed to shape European lowland landscapes, while being rarely compatible with mountain environments. On the contrary, regional planners, decision-makers and even mountain communities themselves should be more aware of the fact that mountain areas require specific economic and territorial development models taking into account the peculiar features of each region and of mountain areas in general, which should not be conceived as obstacles or disadvantages, as it happens today, but as opportunities for inspiring sustainable development strategies even outside mountain regions.

Maintenance of viable communities

Italian mountain policy – although largely ineffective in reaching its goal – has been mainly targeted towards avoiding geographical marginalisation processes (see Paragraph 3.2.1), in particular by trying to maintain local population in the uplands, while rarely focusing on other aspects such as the keeping up of cultural landscape. To this end, mountain farming played a minor role, while secondary and tertiary sectors were enhanced, although mountain industrial districts and winter tourist resorts have often locally faced the threats typically affecting monocultures (e.g. the eye-wear district in Cadore).

The application of such a strategy to the Italian territory contributed to lead to a process called agricultural marginalisation (see Paragraph 3.2.2), which often caused the loss of most of the cultural landscape features, the disruption of the traditional social structure and an overall lower level of land care provided by local people (see Paragraph 6.3).

Therefore, maintaining settlements characterised by an economically dynamic context in the mountains is a necessary but not sufficient measure to implement for the maintenance of a viable and ecologically valuable territory.

On the other hand, it should be taken into account that the exodus from the uplands does not just have economic roots, but also results from the growing lack or diminishing quality of basic community services, like schools, health units, post offices, transportation and other facilities, as well as from a lack of cultural identity or identification with a community. On this purpose, a major role is played by the so-called "social capital" (see Paragraph 4.4) as well as by the socio-cultural initiatives aiming at improving the overall viability of mountain communities.

The Austrian model: integration of sectorial and regional planning policies

The Austrian case-study represents a good practice as regards the implementation of a proactive and targeted mountain farming policy as well as a successful strategy based on the concept of endogenous regional development (see Chapter 9).

The Austrian experience has also shown that a successful mountain policy can only be implemented by incorporating spatially oriented sectorial policies in integrated regional development strategies (Dax, 2001). Only an appropriate patchwork of different agricultural and non-agricultural policies associated with various economic, social, environmental and cultural functions can foster sustainability and viability in rural regions and combat marginalisation successfully (Wiesinger and Dax, 2005).

The implementation of an integrated and effective policy for mountain areas has actually always been a crucial political and popular issue in Austria. Accordingly, two complementary lines of intervention can be distinguished (see Paragraph 9.2):

- *subsidy-based policy,* i.e. a support system based on mountain farms financial aid;
- *regional planning,* i.e. an integrated regional policy approach aimed at strengthening endogenous regional development.

Four main lessons can thus be drawn from the Austrian experience:

- mountain areas need to be acknowledged as the living and working space for mountain communities, as well as an essential economic, environmental and social resource for the whole society;

- clearly formulated objectives and targets are called for in the policy for mountain areas;
- agriculture, and mountain farming in particular, is to be conceived as a multifunctional activity, providing a whole range of outputs beyond the production of foodstuff and fibre (e.g. maintenance of rural cultural landscapes);
- integration of sectorial and regional planning policies is necessary in order to make mountain policies successful.

Diversification, pluriactivity and part-time farming

Mountain policies encouraging the diversification of farming activities are essential in:

- preventing overall land abandonment and maintaining a certain minimum population level in economically backward areas suffering from geographical marginalisation and rural exodus;
- preventing or significantly lessening farmland abandonment in those areas affected by agricultural marginalisation, where secondary or tertiary sectors dominate economic development.

Particularly in this latter case diversification takes the form of part-time farming, where farming activities are run beyond another full- or part-time job (pluriactivity). To this end the following measures are needed:

- equal treatment of full- and part-time farmers as regards financial aids, which are to be seen as potential tools able to make part-time farming an economically sufficiently viable activity;
- regional policies aimed at developing an overall dynamic economic context and a multi-sectorial economic structure, in order to assure a large availability of off-farm and on-farm non-agricultural (e.g. agritourism or handicraft) employment opportunities.

Promotion of diversification and part-time farming may thus benefit:

- the overall economic context, by providing various employment opportunities and diversifying the economic bases, thus preventing the establishment of mono-sectorial uses (e.g. tourism);
- the environmental resources, by reducing farmland abandonment, thus preventing significant and irreversible bio and eco-diversity losses;
- the social structure, by preventing the thorough disruption of traditional rural society and slowing down depopulation trends, as in many regions mountain farmers might still represent an important factor in economic and social relations.

Highly differentiated rural development aid measures

The most recent CAP reform, and particularly the decoupling scheme, seems not to affect significantly mountain regions, since rural development measures, and particularly LFAs compensatory allowances and agri-environmental scheme, represent the foremost financial tool influencing the continuation of mountain farming, at least in those countries, e.g. Austria, where the major share of the CAP budget is allocated to this kind of measures[1]. The growing shift of funds from first to second pillar is thus expected to imply positive effects for mountain areas.

At national level (regional level in Italy) an even greater significance ought to be given to these measures within the local Rural Development Plans, not only in terms of the share of budget allocated to them, but above all by targeting and differentiating the direct payments as much as possible, as suggested by the Rural Development Regulation itself.

In particular, the role of agri-environmental measures in compensating farmers for the maintenance of positive externalities provided by extensive farming systems should be emphasised, rather than the already widely recognized goal of reducing negative ecological effects caused by intensive farming systems (see Paragraphs 1.3 and 7.2).

If the Alps are to have a viable future, the first and foremost task should be responsible management of their landscapes, including a commitment to their ecological stability: the easiest and most effective way to achieve this is through farming practices adapted to environmental conditions on a small scale, since most of these are extensive farming systems containing empirical knowledge about sustainable use of natural resources (Stone, 1992).

A more differentiated and graduated financial aid system would avoid cost-ineffective indiscriminate financing, while representing potential benefits for the small-scale mountain farm holdings facing the highest difficulties (see Paragraph 9.3).

Such a decision, along with strengthening mountain farming support, are to be driven by a specific political commitment towards mountain areas: although this mainly depends on socio-cultural factors, economic aspects are gaining growing importance, both for the role of mountain farming in maintaining cultural landscape, which is a fundamental tourist asset, and for the increasing opportunities provided by the market as regards typical agricultural products, organic farming and so on. Demand for specialist products of certain rural regions might contribute significantly to the survival of farming systems which otherwise would not be viable.

[1] For instance, decoupling of direct payments is actually expected to have significant impact on the output and structure of agriculture in the Scottish LFAs, accounting for 85% of the Scottish land area and comprising of some of the most marginal land areas in the EU, because of the general lack of alternatives for upland farmers, who may find it impossible to diversify from the existing practice into another, more market-oriented farming activity (Gelan and Schwarz, 2005). Such a great impact mainly depends on the much higher share of the CAP budget allocated to market support measures (CAP first pillar) (Schwarz, personal communication, 2005).

Raising public awareness and political commitment towards mountain areas

The overall state of abandonment of large farmland extensions in many Italian Alpine regions along with the lack of effective policies specifically targeting mountain farming and mountain communities are mainly due to the low level of both social consent and political attention on these issues, which too often are not even perceived as problems to tackle.

On the other hand, raising awareness about the significance of the negative impacts caused by land abandonment and the consequent forest expansion trend would be essential in creating a social consent about the advisability of proactive policies targeting mountain areas and therefore raising the level of political attention towards them. Above all, the importance of maintaining settlements and agricultural activities in the mountains and their concern to the whole society, downstream communities in particular (see Paragraph 2.2.2), should be acknowledged.

Indeed farmland abandonment and, more generally, desertion of mountain territories, create environmental, economic and social impacts affecting not only mountain districts, but the whole society. Therefore social and political interrelationships between upstream and downstream dwellers should be strengthened at basin level (see for instance Paragraph 10.2). In particular, if drinking water becomes scarcer in future, the high-quality water resources of the Alpine region will have a considerable option value, and strategies based on sustainable and extensive agriculture and forestry may prove to be highly profitable (OECD, 2002), since it is mountain communities' management of natural resources on the mountain slopes which determines the manner in which water is available for development in the lowland communities (Mountain Agenda, 1992).

However, a debate about an integrated and comprehensive policy on mountain farming will soon necessarily become a topical subject at national level, if the Italian Parliament will finally ratify the Protocols of the Alpine Conventions, and the Protocol on Mountain farming among them, as promised by the Italian government and expected by all of the other signatory countries. The identification and implementation of specific measures and policies on mountains and mountain farming in particular will then be unpostponable.

Although land abandonment already started to affect Italian Alpine regions several decades ago, there is still some room for reversing the overall trend and trying to preserve what can still be preserved.

The research undertaken moves in this direction, in the hope that the information, analyses and suggestions here provided will soon turn to be of some use to this end.

LIST OF PEOPLE INTERVIEWED

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REFERENCES

Aarnink, W., Bunning, S., Collette, L. and Mulvany, P., 1998. *Sustaining agricultural biodiversity and agro-ecosystem functions. Opportunities, incentives and approaches for the conservation and sustainable use of agricultural biodiversity in agro-ecosystems and production systems*. Report of the International Technical Workshop organized jointly by the Food and Agriculture Organization of the United Nations and the Secretariat of the Convention on Biological Diversity, with the support of the Government of the Netherlands, 2 - 4 December 1998, FAO Headquarters, Rome

Abramo, E., 2004. *La biodiversità e gli incendi boschivi*. Azienda Regionale Veneto Agricoltura, Padova

Agnoletti, M., 2002. *Il paesaggio agro-forestale toscano. Strumenti per l'analisi, la gestione e la conservazione*. Agenzia Regionale per lo Sviluppo e l'Innovazione nel Settore Agricolo-Forestale (ARSIA), Firenze

Agnoletti, M., 2004. *Una prospettiva storica per la valutazione dello stato dei boschi e del paesaggio forestale italiano*, in: *Ambiente Italia 2004. 100 indicatori sullo stato del paese – Il Mediterraneo e le dinamiche globali*. Rapporto annuale di Legambiente, Edizioni Ambiente, Milano

Árnason, A., Lee, J. and Shucksmith, M., 2004. *Understanding networks and social capital in European rural development.* Improving Living Conditions and Quality of Life in Rural Europe, EU Conference, Westport (Ireland), 30 May – 1 June 2004

Austrian Federal Ministry of Agriculture and Forestry, 1996. *Austrian Memorandum on Mountain and Hill farming and Forestry in Europe*, Vienna

Baldock, D., Beaufoy, G., Brouwer, F. and Godeschalk, F., 1996. *Farming at the margins: abandonment or redeployment of agricultural land in Europe*. Institute for European Environmental Policy (IEEP)/ Agricultural Economics Research Institute (LEI-DLO), London /The Hague

Baldock, D., 1999. *Indicators for High Nature Value Farming Systems in Europe.* In: Brouwer, F.M. and Crabtree, J.R.. *Environmental Indicators and Agricultural Policy*. CABI Publishing, 124-125

Baldock, D., Bignal, E., Jones, A.B. and Jones, G., 2000. *New National proposals for the Less Favoured Areas – EFNCP seminar, Brussels, March 2000*. La Cañada, Newsletter of the European Forum on Nature Conservation and Pastoralism, No. 12, Summer 2000

Bätzing, W., 1997. *Kleines Alpen-Lexikon*. Munich, Beck'sche Reihe

Bätzing, W., 2000. *Rapid Socio-Economic Assessment for the Alps Ecoregion.* WWF Alpine Programme

Bätzing, W., 2002. *Die aktuellen Veränderungen von Umwelt, Wirtschaft, Gesellschaft und Bevölkerung in den Alpen*. Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit/Umwelt Bundes Amt für Mensch und Umwelt, Berlin

Baudry, J., 1991. *Ecological consequences of grazing extensification and land abandonment: role of interactions between environment, society and techniques*. In: *Land abandonment and its role in conservation. Proceedings of the Zaragoza-Spain seminar.* Options Méditerranéennes – Seminar Series A – No. 15 : CIHEAM Centre International de Hautes Etudes Agronomiques Méditerranéennes, 10 -12 December 1989, Zaragoza (Spain): 103-109

Baudry, J. and Asselin, A., 1991. *Effects of low grazing pressure on some ecological patterns in Normandy, France*. In: *Land abandonment and its role in conservation. Proceedings of the Zaragoza-Spain seminar.* Options Méditerranéennes – Seminar Series A – No. 15 : CIHEAM Centre International de Hautes Etudes Agronomiques Méditerranéennes, 10 -12 December 1989, Zaragoza (Spain): 103-109

Baudry, J. and Bunce, R.G.H. (Eds.), 1991. *Land abandonment and its role in conservation. Proceedings of the Zaragoza-Spain seminar.* Options Méditerranéennes – Seminar Series A – No. 15 : CIHEAM Centre International de Hautes Etudes Agronomiques Méditerranéennes, 10 -12 December 1989, Zaragoza (Spain)

Baudry, J., 2003. *Agriculture, landscapes and connectivity*. In: *Environmental Connectivity: Protected Areas in the Mediterranean Basin*, García Mora, M.R. (Coord.), Junta de Andalucía, 71- 80

Beaufoy, G., Baldock, D. and Clark, J., 1994. *The Nature of Farming. Low intensity Farming Systems in Nine European Countries*. Institute for European Environmental Policy, London

Bebi, P. and Baur, P., 2002. *Forest expansion in the Swiss Alps: A Quantitative Analysis of Bio-Physical and Socio-economic Causes*. Austrian Journal of Forest Science, 119: 217-230

Bella, M. and Saponaro, G. (Eds.), 2005. *La riforma della legge sulla montagna*. Unione Nazionale Comuni Comunità Enti Montani (UNCEM), Roma

Bennett, G. (Ed.), 1997. *Agriculture and Natura 2000*. EU Expert Seminar, Dutch Ministry of Agriculture, Nature Conservation and Fisheries, The Hague, 9-11 June 1997

Bethe, F. and Bolsius, E. (Eds.), 1995. *Marginalisation of agricultural land in the Netherlands, Denmark and Germany.* National Spatial Planning Agency, The Hague

Bieberstein Koch-Weser, M. and Kahlenborn, W., 2004. *Legal, economic, and compensation mechanisms in support of sustainable mountain development*. In: Price, M., Jansky, L. and Iatsenia, A.A. (Eds.). *Key Issues for Mountain Areas, 2004*. UN University Press

Bolliger, J., Hagedorn, F., Leifield, J., Zimmermann, S., Böhl, J., Thürig, E., Kienast, F., Soliva, R. and Rutherford, G., 2005. *Developing scenarios of land-use change at the landscape scale to assess species distributions and carbon pools*. In: *Biodiversity conservation and sustainable development in mountain areas of Europe: the challenge of interdisciplinary research*. Presentation to the conference held in Ioannina (Greece), 20-24 September 2005

Bolsius, E., 1998. *Marginalisation and abandonment of Europe's high natural value farmland*. In: Poole, A., Pienkowski, M., McCrocken, P.I., Petretti, F., Breidy, C. and Deffeyes, C.. *Mountain livestock farming and EU policy development*. Proceedings of the Firth European Forum on Nature Conservation and Pastoralism, 18-21 September 1996, Cogne (Italy)

Bordin, A., Cesaro, L., Gatto, P. and Merlo, M., 1998. *Italy*. In: Brouwer, F. and Lowe, P. (Eds.). *CAP and the Rural Environment in Transition: A Panorama of National Perspectives*. Wageningen Pers, The Netherlands, 241-265

Bottazzo, M., Cereda, M. and Favaron, M., 2004. *Interventi per la salvaguardia dell'habitat di gallo cedrone (Tetrao urogallus) nel Parco Naturale delle Orobie Valtellinesi*. In: Atti del Convegno "*Miglioramenti ambientali a fini faunistici: esperienze dell'arco alpino a confronto*", San Michele all'Adige, Trento, 5 giugno 2003. Sherwood 96, Supplemento 2: 45-52

Bourdieu, P., 1979. *La distiction. Critique sociale du jugement*. Édition de Minuit, Paris

Bourdieu, P., 1986. *The Forms of Capital*. In: Richardson, J. (Ed.). *Handbook of Theory and Research for the Sociology of Education*. Greenwood Press, New York, 241-258

Bovolenta, S., 2004. *Gestione della vacca da latte in alpeggio: la sperimentazione in malga*. In: Atti del convegno "*Politiche e scenari dell'Unione Europea per il settore agricolo-forestale della montagna alpina"*, Pedavena, 12-13 Marzo 2004

Brändli, U.-B., 2000. *Waldzunahme in der Schweiz – gestern und morgen*. Informationsblatt Forschungsbereich Landschaft. Eidg. Forschungsanstalt WSL. 45: 1-4 (quoted by Bebi, P. and Baur, P., 2002. *Forest expansion in the Swiss Alps: A Quantitative Analysis of Bio-Physical and Socio-economic Causes*. Austrian Journal of Forest Science, 119: 217-230)

Brouwer, F., Baldock, D., Godeshalk, F. and Beaufoy, G., 1997. *Marginalisation of agricultural land in Europe*. In: *Livestock Systems in European Rural Development*. Conference papers, 23-25 January 1997, Nafplio (Greece)

Brouwer, F. and Lowe, P. (Eds.), 2000. *CAP regimes and the European countryside. Prospects for Integration between agricultural, regional and environmental policies*. CABI Publishing, Wallingford

Brouwer, F. and van der Straaten, J. (Eds.), 2002. *Nature and Agriculture in the European Union. New perspectives on policies that shape the European countryside*. Edward Elgar Publishing Ltd, Cheltenham, UK/Northampton, MA, USA

Brouwer, F. (Ed.), 2004. *Sustaining agriculture and the rural environment. Governance, Policy and Multifunctionality*. EE Publishing Limited, Cheltenham, UK

Brown, V. K., 1991. *Early successional changes after land abandonment: the need for research.* In: *Land abandonment and its role in conservation. Proceedings of the Zaragoza-Spain seminar*. Options Méditerranéennes - Seminar Series A - No. 15 : CIHEAM Centre International de Hautes Etudes Agronomiques Méditerranéennes, 10 -12 December 1989, Zaragoza (Spain): 97-101

Buck, T. and Ortiz de Arri, Y., 2003. *EU agrees radical farming reforms*. Financial Times, June 26, 2003

Buller, H., 2000. *The Agri-environmental Measures (2078/92).* In: Brouwer, F. and Lowe, P. (Eds.). *CAP regimes and the European countryside. Prospects for Integration between agricultural, regional and environmental policies.* CABI Publishing, Wallingford, 199-219

Bunce, R.G.H., Pérez-Soba, M. and Beaufoy, G., 2004. *Application of the DPSIR (Driving forces, Pressures, State, Impact, Response) framework for the identification of the habitats depending upon transhumance*. In: Bunce, R.G.H., Pérez-Soba, M., Jongman, R.H.G., Gómez Sal, H., Herzog, F. and Austad, I. (Eds). *Transhumance and Biodiversity in European Mountains*. Report from the EU-FP5 project Transhumount, IALE Publication N. 1, 285-303

Bundesministerium für Land – und Forstwirtschaft, Umwelt- und Wasserwirtschaft (BMLFUW), 2003. *Grüner Bericht über die Lage der österreichischen Landwirtschaft 2002*, Wien

Bundesministerium für Land – und Forstwirtschaft, Umwelt- und Wasserwirtschaft (BMLFUW), 2004. Internal documentation, unpublished

Burnett, K., 1998. *Local Heroics: Reflecting on Incomers and Local Rural Development Discourses in Scotland*. Sociologia Ruralis, Vol. 38, No. 2: 204-224

Burt, R.S., 2000. *Network Structure of Social Capital.* Institute Européen d'Administration d'Affaires

Campagne, P., Carrere, G. and Valceschini, E., 1990. *Three agricultural regions of France: three types of pluriactivity*. Journal of Rural Studies, 6: 415-422

Candido, P., 2004. *L'insediamento del bosco nei prati abbandonati del Comune di Rigolato (UD).* Degree thesis in Forest Sciences, University of Padua

Caraveli, H., 2000. *A comparative analysis on intensification and extensification in Mediterranean agriculture: dilemmas for LFAs policy*. Journal of Rural Studies, 16: 231-242

Centro di Ecologia Alpina (CEA), 2005. Official website, www.cealp.it

Cernusca, A., Tappeiner, U., Bahn, M., Bayfield, N., Chemini, C., Filat, F., Graber, W., Rosset, M., Siegwolf, R. and Tenhunen, J., 1996. *ECOMONT: ecological effects of land use changes on European terrestrial mountain ecosystems*. Pirineos, 147-148: 145-171

Cernusca, A., Bahn, M., Bayfield, N., Chemini, C., Fillat, F., Graber, W., Rosset, M., Siegwolf, R., Tappeiner, U., Tasser, E. and Tenhunen, J., 1998a. *ECOMONT: new concepts for assessing ecological effects of land use changes on terrestrial mountain ecosystems at an European scale*. Verhandlungen der Gesellscahft fűr Ökologie, 28: 3-11

Chemini, C. and Gianelle, D., 1999. *Pascolo e conservazione della biodiversità*. In: Atti deòl convegno "*Presente e futuro dei pascoli alpini in Europa - Fra tradizione ed innovazione. Bisogni, novità tecniche, implicazioni culturali ed ambientali"*. Franco Angeli, Bergamo, 4-5 dicembre 1997: 36-48

Chemini, C. and Rizzoli, A., 2003. *Land use change and biodiversity conservation in the Alps*. Journal of Mountain Ecology, 7 (Supplement): 1-7

Ciccarese, L. e Pettenella, D., 2005. *Il Protocollo di Kyoto: quali possibilità per i gestori delle foreste italiane nel mercato delle quote?* Sherwood, 108: 5-9

CIPRA International, 2004. *Emigrazione: unica alternativa?* CIPRA INFO No. 71

CIPRA International, 2005. CIPRA official website, www.cipra.org

CJC Consulting, 2003. *The review of area-based Less Favoured Area Payments across EU Member States.* Report for the Land Use Policy Group of the GB statutory conversation, countryside and environment agencies, Oxford

Cole, D.N., 2001. *Management dilemmas that will shape wilderness in the 21st century*. Journal of Forestry, Vol. 99, No. 1: 4-8

Coleman, J.S., 1988. *Social Capital in Creation of Human Capital*. American Journal of Sociology, 94: 95-120

Comitato Tecnico Interministeriale per la Montagna, 2003. *IX Relazione sullo stato della montagna italiana*. Roma

Commission of European Communities (CEC), 1980. *Effects on the environment of the abandonment of agricultural land.* Information on Agriculture No. 62, Commission of European Communities. Brussels

Commission of European Communities (CEC), 2001a. *Ten years after Rio: Preparing for the World Summit on Sustainable Development in 2002*. Communication from the Commission to the Council and the European Parliament. Brussels

Commission of European Communities (CEC), 2001b. *Sixth Environment Action Programme "Environment 2010: Our future, Our choice".* Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions. Brussels

Commission of European Communities (CEC), 2001c. *Biodiversity Action Plan for Agriculture*. Communication from the Commission to the Council and the European Parliament. Brussels

Commission of European Communities (CEC), 2002. *Eurostat's Natural Resource Accounts for Forests.* Office for Official Publications of the European Communities (OPOCE), Luxembourg

Committee of Ministers, 2001 *Reply to the Draft European outline convention on mountain region CLRAE Recommendation 75 (2000).* CM/Del/Dec(2999)719/12.1 and (2001)744/1.1

Committee of Regions (CoR), 1995. *Opinion on the European Charter on Mountain Areas.* Opinion No. 59 of 20 April 1995

Committee of Regions (CoR), 2003. *Report on Community action for mountain areas, 2003/c 128/05, 12 February 2003*

Committee on Agriculture and Rural Development, 1998. *Report on a new strategy for mountain regions*

Committee on the Environment, Agriculture and Local and Regional Affairs of the Parliamentary Assembly of the Council of Europe, 2003a. *Report on sustainable development of mountain regions*. Doc. 9922

Committee on the Environment, Agriculture and Local and Regional Affairs of the Parliamentary Assembly of the Council of Europe, 2003b. *Conference on the Sustainable Development of Mountain Regions, European Transit Policy and the Challenge of Globalisation, Cavalese (Italy), on 16-17 June 2003. Final declaration*

Conference of the Parties to the Convention on Biological Diversity (COP-CBD), 1996. *COP-3 CBD Decision III/11.* Buenos Aires.

Congress of Local and Regional Authorities of Europe (CLRAE), 1995 *Recommendation 14 (1995) on The European Charter of Mountain Regions*

Congress of Local and Regional Authorities of Europe (CLRAE), 2000. *Recommendation 75 (2000) on the draft European outline convention on mountain regions*

Congress of Local and Regional Authorities of Europe (CLRAE), 2003. *Recommendation 130 (2003) on the European Charter for Mountains*

Convention on Biological Diversity - Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), 2002. *Main theme: Mountain biodiversity*. *Status and trends of, and threats to, mountain biological diversity.* UNEP/CBD/SBSTTA/8/5

Coordination Paysanne Européenne (CPE), 2003. *CAP Reform: "A scandal"* (published on the website http://www.southcentre.org)

Council of Europe, 2000. *European Landscape Convention*, Florence, 20 October 2000

Cristóvão, A., 2002. *Sustainability and rural development in mountain areas: issues and challenges*. In: *Innovative Structures for the Sustainable Development of Mountain Areas*. Proceedings of the ISDEMA Conference in Thessaloniki, Greece, November 8 to 9, 2002 – Vol. II: 61-65

Dax, 1997. *Mountain Policies in Austria: experiences and outlook on an integral policy approach*. Intervento al seminario internazionale "*Quale futuro per l'agricoltura montana in Europa: politiche di sviluppo, di sostegno o di tutela*", 7 ottobre 1997, Milano

Dax, T. and Wiesinger, G. (Eds.), 1997. *Integration of Environmental Concerns into Mountain Farming. Report of the Regional Network "Central and Eastern Alps"*. Project Report, Paris

Dax, T. and Wiesinger, G. (Eds.), 1998. *Mountain Farming and the Environment: towards Integration. Perspectives for mountain policies in Central and Eastern Europe*. Research Report No. 44, Bundesanstalt für Bergbauernfragen, Vienna

Dax, T., 2001. *Endogenous development in Austria's Mountain Regions: from a source of irritation to a mainstream movement*. Mountain Research and Development, Vol. 21, No. 3, August 2001: 231-235

Dax, T., 2002. *Mountain development research, listing of project and project areas*. In: *Innovative Structures for the Sustainable Development of Mountainous Areas*. Paper to the Thessaloniki Seminar, 17-18 March 2002

Dax, T., 2002. *Experiences from rural development policy in Austria.* Contribution to the XXI Summer Course Desarollo rural y gestión territorial, University of the Basque Country, Donostia – San Sebastian (Spain), 1-2 August 2002

Dax, T. and Hovorka, G., 2003. M*ountain policy in Austra: its integrated approach to rural development and contribution to multifunctional landscapes*. In: Brandt, J. and Vejre, H., (Eds.). *Multifunctional landscapes Volume II – Monitoring, Diversity and Management*. WIT Press: 207-220

Dax, T. and Machold, I. (Eds.), 2003. *Voices of Rural Youth. A Break with Traditional Patterns? Policies and Young People in Rural Development (PAYPIRD)*. Bundesanstalt für Bergbauernfragen, Vienna

Dax, T., 2004. *The impact of EU policies on mountain development in Austria.* In: Regional Studies Association – International Conference, *Europe at the Margins: EU Regional Policy, Peripherality and Rurality*, 15 – 16 April 2004, Angers, France

Dax, T. and Hovorka, G., 2004. *Integrated development for multifunctional landscapes in mountain areas*. In: Brouwer, F. (Ed.). *Sustaining agriculture and the rural environment. Governance, Policy and Multifunctionality*. EE Publishing Limited, Cheltenham, UK

Delpeuch, B., 2004. *Natura 2000 and Agriculture* (published on the website http://europa.eu.int/comm/agriculture)

De Bernardi, P., 2004. Interview published on www.envi.info.it - Portale di Comunicazione Ambientale

De Franceschi, P.F. and De Franceschi, G., 2004. *Esperienze di ripristino e di riqualificazione ambientale per alcune specie di galliformi alpini nelle alpi carniche centrali*. In: Atti del Convegno "*Miglioramenti ambientali a fini faunistici: esperienze dell'arco alpino a confronto*", San Michele all'Adige, Trento, 5 giugno 2003. Sherwood 96, Supplemento 2: 39-43

Dunjó, G., Pardini, G., Gispert, M., 2003. *Land use change effects on abandoned terraced soils in a Mediterranean catchment, NE Spain*. Catena, 52: 23-27

Dwyer, J., Baldock, D., Beaufoy, G., Bennett, H., Lowe, P., and Ward, N., 2002. *Europe's Rural Futures: The Nature of Rural Development II.* Report commissioned by the Land Use Policy Group and WWF Europe

Euromontana, 1995. *Déclaration finale de la conférence de Cracovie : Montagnes d'Europe, nouvelles coopérations pour un développement durable.* Krakow, 4-6 September 1995
Euromontana, 1997. *Integration of Environmental Concerns into Mountain Farming*. Interim Report to CEC DGXI. Paris/Brussels

Euromontana, 1998. *Integration of Environmental Concerns into Mountain Farming.* Final report on the study commissioned by DG XI. Paris/ Brussels

Euromontana, 2000. *Final Declaration for the Second European Mountain Conference*. Trento, 17 and 18 March 2000

Euromontana, 2005. Official website, www.euromontana.org

European Commission (EC), 1997. *Rural Developments*. CAP 2000 working document. Directorate General for Agriculture. Brussels

European Commission (EC), 1999. *European Spatial Development Perspectives - Towards Balanced and Sustainable Development of the Territory of the European Union*

European Commission (EC), 2000. *Indicators for the Integration of Environmental Concerns into the Common Agricultural Policy.* Communication from the Commission to the Council and the European Parliament, Brussels

European Commission (EC), 2002. *Mid-Term Review of the Common Agricultural Policy*. Communication to the Council and the European Parliament, July 7, 2002

European Commission (EC) and Eurostat, 1999. *Agriculture, environment, rural development: facts and figures – a challenge for agriculture*, Brussels: DG VI, DG XI and Eurostat

European Communities , 1957. *Treaty Establishing the European Economic Community*. Rome

European Communities, 1991. *Convention on the protection of the Alps (Alpine Convention).* English Translation, Official Journal of the European Communities

European Economic and Social Committee (EESC), 2003. *Opinion on "The future of upland areas in the EU"*. Official Journal C 061, 14/03/2003 P. 0113 – 0122

European Environment Agency (EEA) (Ed.), 1999a. *Environment in the European Union at the turn of the century*. Environmental assessment report No 2, Office for Official Publications of the European Communities, Luxembourg

European Environment Agency (EEA), 1999b. *Environmental indicators, Typology and Overview*. EEA Copenhagen

European Environment Agency, European Topic Centre on Terrestrial Environment (EEA, ETC/TE), 2004. http://terrestrial.eionet.eu.int

European Environment Agency (EEA), 2005. http://dataservice.eea.eu.int

European Intergovernmental Consultation on Sustainable Mountain Development, 1996. *Towards Sustainable Mountain Development in Europe*. Aviemore Session, 22-27 April 1996; Trento Session, 7-11 October 1996

European Landowners' Organisation (ELO), 2003. *Considerations for Landowners from the 2003 CAP reform. The CAP Reform: entrepreneurial opportunities in the enlarged Europe*. Conference proceedings, Brussels, 6-7 November 2003

European NGO Consultation on Sustainable Mountain Development, 1996. *Recommendations of NGOs and Mountain Populations to Governments and to the European Union*. ARPE and CIAPP, Toulouse, France

European Parliament, 1998. *Resolution on a new strategy for mountains, less-favoured and environmentally sensitive regions.* Document A4-0368/98 adopted 23 October 1998. European Parliament, Brussels

European Parliament and the Council, 2002. *Decision No. 1600/2002/EC of the European Parliament and the Council of 22 July 2002 laying down the Sixth Community Environment Action Programme*. Official Journal of the European Communities

Eurostat, 1997. *Farm Structure Survey*. Office for Official Publications of the European Communities (OPOCE), Luxembourg

Eurostat, 2001. *Environment statistics, Pocketbook, Data 1980-1999*. Office for Official Publications of the European Communities (OPOCE), Luxembourg

Eurostat, 2003. *Forestry statistics, Pocketbook, Data 1990-2002*. Office for Official Publications of the European Communities (OPOCE), Luxembourg

FAO, 2000. *International Year of Mountains: Concept Paper*. Rome

Farina, A., 1991. *Recent changes of the mosaic patterns in a montane landscape (north Italy) and consequences on vertebrate fauna*. In: *Land abandonment and its role in conservation. Proceedings of the Zaragoza-Spain seminar*. Options Méditerranéennes – Seminar Series A – No. 15 : CIHEAM Centre International de Hautes Etudes Agronomiques Méditerranéennes, 10 -12 December 1989, Zaragoza (Spain): 121-134

Farina, A., 1997. *Landscape structure and breeding bird distribution in a sub-mediterranean agro-ecosystem.* Landscape Ecology, 12: 365-378

Favry, E., 2004. *REGALP Project Summary – Project description, main findings, conclusions and recommendations*. REGALP: Regional Development and Cultural Landscape Change: The Example of the Alps – Evaluating and Adjusting EU and National Policies to Manage a Balanced Change. Vienna

Feás Vázquez, J., 2003. *A methodology for policy analysis in water resources management*. European Summer School in Resources and Environmental Economics – Political Economy of the Environment, Venice, September 1st - 6th 2003

Felton, M., 2005. *LFAs and biodiversity*. In: *CAP Reform 2003, Rural Development Policy, Financial Perspectives: Rural Development Post 2006*. Committee of Agricultural Organisations in the European Union, General Confederation of Agricultural Co-operatives in the European Union. Brussels (Belgium), 27-28 January 2005

Fernandez Ales, R., 1991. *Effect of economic development on landscape structure and function in the Provicen of Seille (SW Spain) and its consequences on conservation*. In: *Land abandonment and its role in conservation. Proceedings of the Zaragoza-Spain seminar*. Options Méditerranéennes – Seminar Series A – No. 15 : CIHEAM Centre International de Hautes Etudes Agronomiques Méditerranéennes, 10 -12 December 1989, Zaragoza (Spain): 61-69

Fodella, A. & Pineschi, L. 2000. *Environment Protection and Sustainable Development of Mountain Areas - Preliminary Report*. Mountains and the Environment: Ten Years after Rio, Courmayeur, 16 and 17 June 2000

Franceschetti, G. (Ed.), 1984. *Terre incolte nel Veneto – Una analisi territoriale ed economica dei fenomeni dell'abbandono dei terreni.* Regione del Veneto

Fukuyama, F., 1999. *Social Capital and Civil Society*. Paper prepared for the International Monetary Fund conference on Second Generation Reforms, Nov. 8-9, 1999, Washington D.C.

García-Ruiz, J.M., Ruiz-Flaño, P., Lasanta, T., Monserrat, G., Maritnez-Rica, J.P. and Pardini, G., 1991. *Erosion in abandoned fields, what is the problem?* Soil Erosion Studies in Spain, 3: 97-108

García-Ruiz, J.M., Lasanta, T., Martì, C., Gonzáles, C., White, S., Ortigosa, L. and Ruiz-Flaño, P., 1995. *Changes in runoff and erosion as a consequence of land-use changes in the central Spanish Pyrenees*. Physical Chemical Earth, Vol. 20, No. 3-4: 301-307

García-Ruiz, J.M., Lasanta, T., Ruiz-Flaño, P., Ortigosa, L., White. S., Gonzáles, C., and Martì, C., 1996. *Land use changes and sustainable development in mountain areas: a case study in the Spanish Pyrenees*. Landscape Ecology, Vol. 11, No. 5: 267-277

Gelan, A. and Schwarz, G., 2005. *Impacts of CAP Reform on Less-Favoured Areas in Scotland*. Conference Paper, AAG Annual Meeting, 5-9 April 2005, Denver, Colorado

Genghini, M., 1994. *I miglioramenti ambientali a fini faunistici*. INFS (Istituto Nazionale per la Fauna Selvatica), Documenti Tecnici, 16

Genghini, M. and Busatta, S., 2001. *Sistemi o habitat agricoli di elevato valore naturalistico: definizioni e quantificazioni*. Agribusiness Paesaggio e Ambiente, Rivista Internazionale Interdisciplinare. Vol. 5, No. 2: 106-118

Genghini, M. and De Berardinis, A., 1999. *Evoluzione del paesaggio agrario e valorizzazione del territorio.* Agribusiness Paesaggio & Ambiente, Rivista Internazionale Interdisciplinare. Vol. 3, No. 4: 264-277

Genghini, M., 2004. *Habitat e fauna alpina: dalle normative alle realizzazioni in Italia e all'estero*. In: Atti del Convegno "*Miglioramenti ambientali a fini faunistici: esperienze dell'arco alpino a confronto*", San Michele all'Adige, Trento, 5 giugno 2003. Sherwood 96, Supplemento 2: 13-20

Giupponi, C. 2002. *From DPSIR framework to a system for dynamic and integrated decision making process*. In: *Policy and tools for sustainable water management at the EU*. CD-ROM

Gold, S., 2003. *The development of European forest resources (1950 to 2000)*. Geneva timber and forest discussion papers - United Nations Economic Commission for Europe (UNECE)/Food and Agriculture Organization (FAO)

Gonzalez Bernaldez, 1991. *Ecological consequences of the abandonment of traditional land use systems in central Spain.* In: *Land abandonment and its role in conservation. Proceedings of the Zaragoza-Spain seminar*. Options Méditerranéennes – Seminar Series A – No. 15 : CIHEAM Centre International de Hautes Etudes Agronomiques Méditerranéennes, 10 -12 December 1989, Zaragoza (Spain): 23-29

Groier, M., 2004a. *Wachsen und Weichen – Rahmenbedingungen, Motivationen uns Konsequenzen von Betriebsaufgaben in der österreichischen Landwirtschaft*. Bundesanstalt für Bergbauernfragen, Forschungsbericht Nr. 51

Groier, M., 2004b. *Regional effects of the Austrian agri-environmental programme ÖPUL in the case study area Bludenz-Bregenzer Wald.* ESPON Project 2.1.3, June 2004, Vienna

Guillot, P., Fleury, P. and Jeannin, B., 1998. *Représentations de la montagne alpine dans la presse et les guides touristiques: conséquences pour une approche physionomique du paysage*. Cahiers Agricultures, 7: 213-221

High–level Pan–European Conference on Agriculture and Biodiversity, 2002. *Final Declaration on the conservation and sustainable use of biological and landscape diversity in the framework of agricultural policies and practices*. High-Level Pan-European Conference on Agriculture and Biodiversity: Towards Integrating Biological and Landscape Diversity for Sustainable Agriculture in Europe - Council of Europe, French Government and UNEP, Paris, 5-7 June 2002

Höchtl, F., Lehringer, S., Konold, W., 2004. *„Wilderness": what it means when it becomes a reality – a case study from the southwestern Alps*. Landscape and Urban Planning, 70: 85-95

Hodge, I., 1998. *Amenity Policy, Sustainability and the Maintenance of the Cultural Landscape*. In: OECD-Group of the Council on Rural Development. *Rural Amenity in Austria, A Case Study of Cultural Landscape*. OECD-C/RUR(98)4, Paris

Hopkins, J., 1998. *Achieving the aims of the EC Habitats Directive: links with reform of agricultural policies in mountain areas*. In: Poole, A. et al. (Eds.). *Mountain Livestock Farming and EU Policy Development.* European Forum for Nature Conservation and Pastoralism, Islay: 117-125

Hovorka, G., 1998. *The cultural landscape in the mountain areas of Austria*. In: OECD, 1998. *Rural Amenity in Austria, A Case Study of Cultural Landscape.* OECD-Group of the Council on Rural Development, C/RUR(98)4, Paris

Hovorka, G., 2002. *Agriculture in the mountain areas of Austria in an international context*. Ländlicher Raum No. 2: 1 – 8

Hovorka, G., 2004. *Evaluation of the compensatory allowances scheme under the EU regulation 1257/99 in Austria and in other EU Member States*. In: Proceedings of the 87th EAAE Seminar*: Assessing Rural Development policies of the CAP*, 21-24 April 2004, Vienna

Hubert, B., 1991. *Changing land uses in Province (France). Multiple use as a management tool*. In: *Land abandonment and its role in conservation. Proceedings of the Zaragoza-Spain seminar.* Options Méditerranéennes – Seminar Series A – No. 15 : CIHEAM Centre International de Hautes Etudes Agronomiques Méditerranéennes, 10 -12 December 1989, Zaragoza (Spain): 31-52

Hunziker, H., 1995. *The spontaneous afforestation in abandoned agricultural lands: perception and aesthetic assessment by locals and tourists*. Landscape and Urban Planning, 31: 399-410

Hunziker, M., Gehring, K. and Bucheker, M., 2005. *Objectives and conflicts regarding Alpine landscape development – measuring the effect of consensus-building procedures*. In: *Biodiversity conservation and sustainable development in mountain areas of Europe: the challenge of interdisciplinary research.* Presentation to the conference held in Ioannina (Greece), 20-24 September 2005

International Workshop on Sustainable Mountain Development, 2001. *Cusco Declaration on Sustainable Development of Mountain Regions.* International Workshop on Mountain Ecosystems: A Vision of the Future, Cusco, Peru, 25-27 April 2001

Istituto Nazionale della Montagna, 2001. *Progetto di ricerca "Uso del suolo come difesa", rapporto preliminare*. http://www.inrm.it/Ricerca/index.html

IUCN, 1999. *Background study for the development of an IUCN Policy on Agriculture and Biodiversity*

IUCN European Regional Office, 2000. *Discussion Paper on Agricultural Biological Diversity.* Intergovernmental Conference "*Biodiversity in Europe*", Riga, Latvia, 20-23 March 2000

Ives, J.D., 1992. *Preface* (xiii-xvi). In: Stone, P. B. (Ed.). *The State of the World's Mountains*. Zed Books, London

Jochimsen, M.E., 1991. *Advantages and possibilities of recultivating fallow land in accordance with natural succession*. In: *Land abandonment and its role in conservation. Proceedings of the Zaragoza-Spain seminar.* Options Méditerranéennes – Seminar Series A – No. 15 : CIHEAM Centre International de Hautes Etudes Agronomiques Méditerranéennes, 10 -12 December 1989, Zaragoza (Spain): 83-95

Jones, D.G.L., Bignal, E., Lysaght, L., Baldock, D. and Phelan, J., 2003. *A review of the CAP Rural Development Plan 2000-2006: implications for natural heritage. Towards policies for Ireland's heritage.* The Heritage Council, Dublin

Keenleyside, C., Veen, P. and Baldock, D., 2004. *Land Abandonment in the new Member States and Candidate Countries and the EU Common Agricultural Policy*. Veen Ecology, Institute for European Environmental Policy, Ministry of Agriculture of the Republic of Latvia, Ministry of Agriculture, Nature and Food Quality of Netherlands, Dutch Government Service for Land and Water Management, Latvian State Institute of Agrarian Economics

Kienast, F., Bolliger, J., Soliva, R., Gehring, K., Rutherford, G. and Hunziker, M., 2005. *People's landscape preferences for scenarios of potential future land-use change*. In: *Biodiversity conservation and sustainable development in mountain areas of Europe: the challenge of interdisciplinary research.* Poster presented to the conference held in Ioannina (Greece), 20-24 September 2005

Knickel, K., 2000. *Changes in farming systems, landscape, and nature: key success factors of Agri-Environmental Schemes (AES)*. In: *Changing agriculture and landscape: ecology, management and biodiversity decline in anthropogenous mountain grassland*. Proceedings of the EUROMAB Symposium, 15-19 September 1999, Vienna

Labaune, C. and Magnin, F., 2002. *Pastoral management vs. land abandonment in Mediterranean uplands: impact on land snail communities*. Global Ecology and Biogeography, 11: 237-245

Lacedelli, P.C., 2004. *Politiche territoriali ed ambientali per contrastare l'avanzamento del bosco*. Degree thesis in Environmental Sciences, University of Venice

Laiolo. P., Dondero, F., Ciliento, E. and Rolando, A., 2004. *Consequences of pastoral abandonment for the structure and diversity of the Alpine avifauna*. Journal of Applied Ecology, 41: 294-304

Lehringer, S., 2001. *Un paese finisce nel bosco – Piana di forno nell'Alta Valle Strona: ultime testimonianza di civiltà rurale. Quale futuro per i paesaggi alpini con il progressivo abbandono dell'agricoltura?*. Le Rive – Bimestrale di cultura, ambiente, turismo fra Piemonte e Lombardia. Anno XV, No., 1/2

Llorens, P., Poch, R., Rabada, D. and Gallart, F., 1995. *Study of the changes of hydrological processes induced by afforestation in Mediterranean mountainous abandoned fields*. Physical Chemical Earth, Vol. 20, No. 3-4: 375-383

MacDonald, D., Crabtree, J.R., Wiesinger, G., Dax, T., Stamou, N., Fleury, P., Gutierrez Lazpita, J. and Gibon, A., 2000. *Agricultural abandonment in mountain areas of Europe: Environmental consequences and policy response.* Journal of Environmental Management, 59: 47-69

Maglia, S. and Santoloci, M., 1998. *Il codice dell'ambiente: legislazione illustrata con il commento, la bibliografia, la giurisprudenza ed il formulario*. Piacenza, la Tribuna Editore

Mangold, S., Kalule-Sabiti, M. and Walmsley, J., 2002. *State of the Environment Report 2002, North West Province South Africa*. North West Province Department Agriculture Conservation and Environment

Miller, D., Belveze, P., Ode, Å. Wissen, U., Schwarz, G., Morrice, J. and Gibon, A., 2004. *VisuLands – Visualization tools for public participation in the management of landscape change. Report on the delivery mechanisms that support landscape related objectives and linkages with indicators of visual quality*

Ministero dell'Ambiente e della Tutela del Territorio, 2002. *Strategia d'azione Ambientale per lo Sviluppo Sostenibile in Italia*

Ministero per i Beni e le Attività Culturali, 2005. Official website. http://www.bap.beniculturali.it/attivita/tutela_paes/convenzione.html

Minns, A., Finn, J., Hector, A., Caldeira, M., Joshi, J., Palmborg, C., Schmid, B., Schere-Lorenzen, M., Spehn, E., Troumbis, A and the BIODEPTH project, 2001. *The functioning of European grassland ecosystems: potential benefits of biodiversity to agriculture.* Outlook on Agriculture, Vol. 30, No. 3: 179-185

Moriconi, E., 2001. *Le Fabbriche degli Animali. "Mucca pazza" e dintorni*. Edizioni Cosmopolis, Torino

Mountain Agenda, 1992. *An Appeal for the Mountains*. Berne, Switzerland

Mountain Agenda, 1999. *Mountains of the world: water towers for the 21st century*. Berne, Switzerland

Naveh, Z., 1994a. *From biodiversity to ecodiversity: a landscape-ecology approach to conservation and restoration.* Restoration Ecology, 2: 180-189

Naveh, Z. *Biodiversity and landscape management*, 1994b. In: Chyng Kim, K., Weaver, R. D.. *Biodiversity and landscapes – A paradox of humanity*. Cambridge University Press. 187-207

Newesely, C., Tasser, E., Spadinger, P. and Cernusca, A., 2000. *Effects of land-use changes on snow gliding processes in alpine ecosystems*. Basic and Applied Ecology, 1: 61-67

Noerring, N.P., 2005. *CAP reform and environmental concerns: the concerns of the European farmers*. In: *CAP Reform 2003, Rural Development Policy, Financial Perspectives: Rural Development Post 2006*. Committee of Agricultural Organisations in the European Union, General Confederation of Agricultural Co-operatives in the European Union. Brussels (Belgium) 27-28 January 2005

Nohl, W., 1990. *Zur Rolle des Nicht-Sinnlichen in der landschaftsästhetischen Erfahrung*. Natur Landschaft, 65: 366-370

Nordregio, 2004. *Mountain Areas in Europe: Analysis of mountain areas in EU member states, acceding and other European countries.* Final report

OECD, 1998. *Rural Amenity in Austria, A Case Study of Cultural Landscape.* OECD-Group of the Council on Rural Development, C/RUR(98)4, Paris

OECD, 2002. *Biodiversity, landscape and ecosystem services of agriculture and forestry in the Austrian Alpine region – An approach to economic (e)valuation*. Working Group on Economic Aspects of Biodiversity

OECD, 2004. *Analysis of the 2003 CAP reform*

OECD, 2005. Official website: http://www.oecd.org/

Pain, D.J. and Pienkowksi, M.W., 1997. *Farming and Birds in Europe*. Academic Press, London

Parliamentary Assembly of the Council of Europe, 1999. *Recommendation 1433 (1999)*

Pasqualetto, A., 2005. *Lanaro: "C'è una questione Montana"*. Corriere del Veneto, Domenica 6 Novembre 2005

Pettenella, D., 1984. *Un approccio all'analisi economica dei fenomeni dell'abbandono e del sottoutilizzo dei terreni in aree marginali*. In: Franceschetti, G. (Ed.). *Terre incolte nel Veneto – Una analisi territoriale ed economica dei fenomeni dell'abbandono dei terreni*. Regione del Veneto

Phimister, E., Roberts, D. and Gilbert, A., 2004. *The Dynamics of Farm Incomes in Scotland: Panel data analysis using the Farm Accounts Survey*. Journal of Agricultural Economics, 55 (2): 197-220

Pignatti, S. (Ed.), 2003. *Utilizzazione delle risorse territoriali e declino della biodiversità*. In: Ferroli, A., Milan, C., Montanari, F.. *Verso un monitoraggio della biodiversità*. I quaderni di ARPA, ARPA Agenzia Regionale Prevenzione e Ambiente dell'Emilia Romagna, Bologna

Pinto Correia, T. and Sørenson, E.M., 1995. *Marginalisation and marginal land: processes of change in the countryside.* Skriftserie 152

Piussi, P. and Pettenella, D., 2000. *Spontaneous Afforestation of Fallows in Italy*. In: Weber, N. (Ed.). *NEWFOR – New Forests for Europe: Afforestation at the Turn of the Century*. Proceedings of the Scientific Symposium, Freiburg, 16-17 February 2000: 151-163

Potter, C., 2002. *Agri-environmental policy development in the European Union*. In: Brouwer, F. and Van der Straaten, J. (Eds.). *Nature and Agriculture in the European Union. New perspectives on policies that shape the European countryside*. Cheltenham, UK/Northampton, MA, USA, Edward Elgar Publishing Ltd: 67-87

Pranzini, E., 1994. *Bilancio sedimentario ed evoluzione storica delle spiagge*. Il Quaternario, I: 197-204

Preiss, E., Martin, J.-L. and Debussche, M., 1997. *Rural depopulation and recent landscape changes in a Mediterranean region: Consequences to the breeding avifauna*. Landscape Ecology, Vol. 12, No. 1: 51-61

Price, M.F., 1998. *Mountains: globally important ecosystems*. Unasylva, Vol. 49, No. 195: 3-11

Price, M.F., Bjoenness, I., Becker, A., Collins, D., Corominas, J., Debarbieux, B., Gardner, R., Gillet, F., Grabherr, G., Heal, B., Kalvoda, J., Perrin-Sanchis, T., Ramakrishnan, P.S., Ruoss, E., Thompson, D., Winiger, M. and Zimmermann, F., 1998. *Global change in the mountains - Final report of the European Conference on Environmental and Societal Change in Mountain Regions.* Oxford, 18-20 December 1997

Price, M.F. and Kim, E.-G., 1999. *Priorities for Sustainable Mountain Development in Europe*. International Journal of Sustainable Development and World Ecology, Vol. 6: 203-219

Price, M.F. and Messerli, B., 2002. *Fostering sustainable mountain development: from Rio to the International Year of Mountains, and beyond*. Unasylva, Vol. 53, No. 208: 6-17

Price, M. F. (Ed.), 2004. *Conservation and Sustainable Development in Mountain Areas*. IUCN, Gland, Switzerland and Cambridge, UK

Pruckner, G.J., 1995. *Agricultural landscape cultivation in Austria: an application of the CVM*. European Review of Agricultural Economics, No. 22; 173-190

Putnam, R.D., 1993. *Making Democracy Work. Civic Traditions in Modern Italy*. Princeton University Press, Princeton New Jersey

Putnam, R.D., 2000. *Bowling Alone: the Collapse and Revival of American Community*. Simon and Schuster, New York

Regione del Veneto, 2000. *Piano di Sviluppo Rurale 2000-20006*

Rotelli, L., 2004. *Modificazione degli habitat riproduttivi del fagiano di monte (Tetrao tetrix) e declino delle sue popolazioni*. In: Atti del Convegno "*Miglioramenti ambientali a fini faunistici: esperienze dell'arco alpino a confronto*", San Michele all'Adige, Trento, 5 giugno 2003. Sherwood 96, Supplemento 2: 57-82

Schaaf, T., 1999. *UNESCO's Man and the Biosphere Programme in mountain areas*. Unasylva, Vol. 50, No. 196: 31-34

Soliva, R. and Ronningen, K., 2005. *Stakeholders' assessment of land-use and biodiversity scenatios in European uplands: a comparative analysis*. In: *Biodiversity conservation and sustainable development in mountain areas of Europe: the challenge of interdisciplinary research.* Presentation to the conference held in Ioannina (Greece), 20-24 September 2005

Statistik Austria, 2001. *Statistisches Jahrbuch Österreichs 2001*. Wien

Statistik Austria, 2005. *Statistisches Jahrbuch Österreichs 2005*. Wien

Stone, P. B. (Ed.), 1992. *The State of the World's Mountains*: *A Global Report.* Zed Books, London

Suárez-Seoane, S., Osborne, P. and Baundry, J., 2002. *Responses of birds of different biogeographic origins and habitat requirements to agricultural land abandonment in northern Spain.* Biological Conservation, 105: 333-344

Tappeiner, U., Tappeiner, G., Hilbert, A. and Mattanovich, E. (Eds.), 2003a. *The EU Agricultural Policy and the Environment, Evaluation of the Alpine Region*. Europäische Akademie Bozen, Blackwell Verlag, Berlin and Wien

Tappeiner, U., Tappeiner, G., Hilbert, A. and Mattanovich, E. (Eds.), 2003b. *Structural Atlas of the Alps*. Data of the EU Project SUSTALP. CD-ROM

Tasser, E., Mader, M. and Tappeiner, U., 2003. *Effects of land use in alpine grasslands on the probability of landslides*. Basic and Applied Ecology, 4: 271-280

Taylor, P.D., Fahrig, L., Henein, K. and Merriam, G., 1993. *Connectivity is a vital element of landscape structure*. Oikos, 68: 571-573

Theil, S., 2005. *Into the woods - Economics and declining birth rates are pushing large swaths of Europe back to their primeval state, with wolves taking the place of people*. Newsweek International, July 4, 2005

Tillberg Mattsson, K. and Stenbacka, S., 2004. *The Role of Social Capital in Local Development: The Case of Leksand and Rättvik, Sweden.* National Report to Restructuring in Marginal Rural Areas (RESTRIM)

Trame, U., 1932. *La conca dell'Alpago nelle Dolomiti Orientali*. Libreria Emiliana Editrice, Venezia

Trarieux, J.M., 2004. *CAP Reform: What Relevance for the WTO Negotiations.* Speech at the 2004 National Farmers Union Convention, Billings, Montana (USA), 7 March 2004

Tucker, G. M. and M.F. Heath, 1994. *Birds in Europe: their conservation status.* Bird Life International, Cambridge

United Nations (UN), 1992. *United Nations Framework Convention on Climate Change*

United Nations (UN), 2002. *Paragraph 42 of the Johannesburg Plan of Implementation*. World Summit on Sustainable Development (WSSD), Johannesburg, 26 August - 4 September 2002

United Nations Commission on Sustainable Development (UNCSD), 1997. *Secretary General's Report on Chapter 13*

United Nations Conference on Environment and Development (UNCED), 1992a. *Agenda 21*. World Summit on Sustainable Development, Rio de Janeiro, 3-14 June 1992

United Nations Conference on Environment and Development (UNCED), 1992b. *Convention on Biological Diversity*. World Summit on Sustainable Development, Rio de Janeiro, 3-14 June 1992

United Nations Economic Commission for Europe (UNECE)/Food and Agriculture Organization (FAO), 1999. *State of European forests and forestry*. Geneva

US Congress, 1964. *US Wilderness Act.* Washington

Villeneuve, A., Castelein, A and Mekouar, M.A., 2002. *Mountains and the law – emerging trends*. FAO Legislative Study,75. Rome

Walther, P., 1986. *Land abandonment in the Swiss Alps: a new understanding of a land use problem*. Mountain Research and Development, 6: 305-314

Whittaker, R.H., 1972. *Evolution and measurement of species diversity*. Taxon, 21: 231-251

Wiesinger, G., 2000. *Die vielen Gesichter der ländlichen Armut. Eine Situationsanalyse zur ländlichen Armut in Österreich.* Forschungsbericht Nr. 36, Wien

Wiesinger, G. and Dax, T., 2005. *Coping with Marginalisation and Multifunctional Land Use – Austrian National Report. EUROLAN, EU - Project Strengthening the Multifunctional Use of European Land.* Final draft

Wiesinger, G., Vihinen, H., Tapio-Bistrom, M.L. and Fagarazzi, L., 2005. *The role of social capital in rural development - Conclusions from a European project on marginalisation and multifunctional land use*. Presentation to the XXI Congress of the European Society for Rural Sociology (ESRS) – *A common European countryside? Change and continuity, diversity and cohesion in an enlarged Europe*, 22 - 26 August, 2005, Keszthely, Hungary

Woolcock, M., 1998. *Social capital and economic development: Toward a theoretical synthesis and policy framework*. Theory and Society, 27: 151-208

World Mountain People Association, 2003. *Charter for World Mountain People*

WWF, 2004. *Le Alpi: un patrimonio naturale unico – Uno scenario per la conservazione della biodiversità.* Frankfurt am Main, Germany

Zaiac, T., 2004. *Study Paper on Nature Conservation Aspects of Afforestation Programmes (Draft).* IUCN Office for Central Europe, Warsaw

Ziliotto, U., Andrich, O., Lasen, C., Ramanzin, M., 2004. *Tratti essenziali della tipologia veneta dei pascoli di monte e dintorni*. Regione del Veneto, Accademia Italiana di Scienze Forestali, Venezia

LEGISLATION

Council Directive 75/268/EEC of 28 April 1975 on mountain and hill farming and farming in certain less- favoured areas

Council Regulation (EEC) No 797/85 of 12 March 1985 on improving the efficiency of agricultural structures

Council Regulation (EEC) No 2328/91 of 15 July 1991 on improving the efficiency of agricultural structures

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive)

Council Regulation (EEC) No 2078/92 of 30 June 1992 on agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside

Council Regulation (EEC) No 2079/92 of 30 June 1992 instituting a Community aid scheme for early retirement from farming

Council Regulation (EEC) No 2080/92 of 30 June 1992 instituting a Community aid scheme for forestry measures in agriculture

Commission Regulation (EC) No 746/96 of 24 April 1996 laying down detailed rules for the application of Council Regulation (EEC) No 2078/92 on agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside

Council Regulation (EC) No 950/97 of 20 May 1997 on improving the efficiency of agricultural structures

Council Regulation (EC) No 1257/1999 of 17 May 1999 on support for rural development from the European Agricultural Guidance and Guarantee Fund (EAGGF) and amending and repealing certain Regulations

Council Regulation (EC) No 1782/2003 of 29 September 2003 establishing common rules for direct support schemes under the common agricultural policy and establishing certain support schemes for farmers and amending Regulations (EEC) No 2019/93, (EC) No 1452/2001, (EC) No 1453/2001, (EC) No 1454/2001, (EC) No 1868/94, (EC) No 1251/1999, (EC) No 1254/1999, (EC) No 1673/2000, (EEC) No 2358/71 and (EC) No 2529/2001

Council Regulation (EC) No 1783/2003 of 29 September 2003 amending Regulation (EC)No 1257/1999 on support for rural development from the European Agricultural Guidance and Guarantee Fund (EAGGF)

Commission Regulation (EC) No 795/2004 of 21 April 2004 laying down detailed rules for the implementation of the single payment scheme provided for in Council Regulation (EC)No 1782/2003 establishing common rules for direct support schemes under the common agricultural policy and establishing certain support schemes for farmers

Commission Regulation (EC) No 796/2004 of 21 April 2004 laying down detailed rules for the implementation of cross-compliance, modulation and the integrated administration and control system provided for in of Council Regulation (EC) No 1782/2003 establishing common rules for direct support schemes under the common agricultural policy and establishing certain support schemes for farmers

Commission Regulation (EC) No 817/2004 of 29 April 2004 laying down detailed rules for the application of Council Regulation (EC) No 1257/1999 on support for rural development from the European Agricultural Guidance and Guarantee Fund (EAGGF)

Decreto del Ministro delle Politiche Agricole e Forestali del 5 agosto 2004. Disposizioni per l'attuazione della riforma della politica agricola comune. Prot. N. 1787

Council Regulation (EC) No 1698/2005 of 10 September 2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD)

Commissione delle Comunità Europee (CEC), 2003. Elenco dei siti di importanza comunitaria per la regione biogeografica alpina. Decisione della Commissione del 22.12.2003, Brussels

Commission of European Communities (CEC), 2004. Proposal for a Council Regulation on support for rural development by the European Agricultural Fund for Rural Development (EAFRD)

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